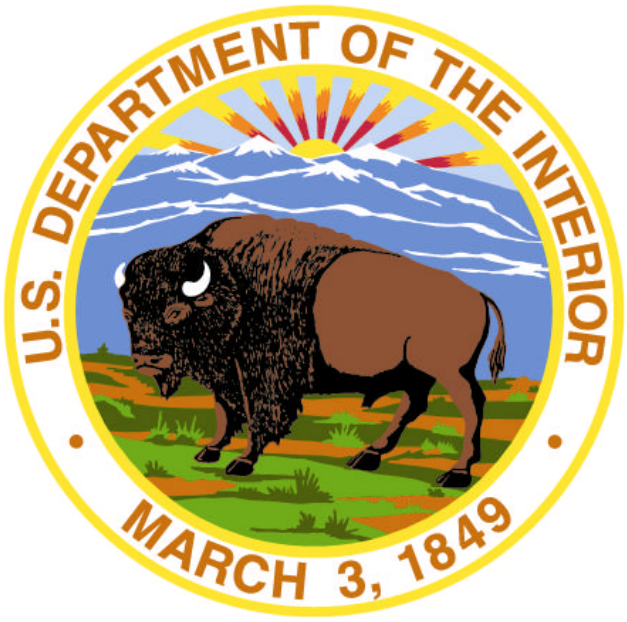
United States
Department of the Interior



Aviation Safety Review
Fiscal Year 03

Prepared by
National Business Center
Aviation Management Directorate
Aviation Safety and Evaluation Division
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Aviation Management Directorate
Attention: Aviation Safety and Evaluation Division
300 E. Mallard Dr., Ste 200
Boise, ID 83706-3991
(208) 433-5070

During the past fiscal year, the Department of the Interior (DOI) experienced a decrease in aviation accidents compared to the previous year. In FY 03, four aircraft accidents produced a rate of 4.79 accidents per 100,000 flight hours. In FY 02, the rate was 8.91.

Unfortunately, the year was marred by four aviation-related fatalities -- two DOI employees and two contract employees. In addition to the four fatalities, three DOI employees incurred serious injuries.

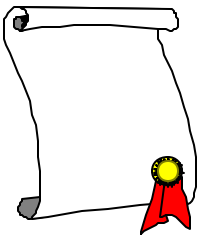
The National Transportation Safety Board (NTSB) investigated all four of the Department's accidents. The Aviation Management Directorate (AMD), Aviation Safety Office, participated in each of these investigations and provided assistance. To date, the NTSB has completed investigation and determined "probable cause" for two of the four FY 03 accidents.

We hope you find the information in this Aviation Safety Review useful. Please direct comments or suggestions to the AMD Aviation Safety Office at (208) 433-5070.

I want to personally thank personnel throughout the Department for their efforts to safely and efficiently use aviation in support of bureau missions. I would especially like to recognize and congratulate those individuals (see page ii) who received Aviation Safety Awards.

I wish everyone a safe and successful FY 04.

/s/ Michael A. Martin
Michael A. Martin
Associate Director, Aviation Management Directorate



Interior Aviation Safety Award
Recipients - 2003

In response to our request for Safety Award Nominees, the following personnel were recognized as follows:

Award for Significant Contributions to Aviation Safety

Eric H. Akola - FWS
Denney Bridges - BIA
Lawrence P. Brosnan - AMD

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Award for In-Flight Actions

James P. Bredy - FWS

******

Secretary's Award of Honor

Michael B. Rearden - FWS
Gregory D. Stover – FWS

******

Award of Honor

David L. Gilbert - FWS
George E. Walters - FWS

Award of Excellence

Richard K. Johnston - FWS
James A. Patterson – FWS

Award of Distinction

Eric H. Akola - FWS
Elizabeth K. Buelna - FWS
Leon F. Fink – NPS
Peter T. Finley – FWS
Stanley F. Pruszenski – FWS
William A. Smoke - FWS

******

Award of Merit

Mike Amicarella - BIA
Shawn R. Bayless - FWS
Vernon R. Bently – FWS
Thomas L. Betts – NPS
John K. Bidwell – FWS
Karen S. Bollinger – FWS
Stephen D. Earsom – FWS
Max J. Huhndorf – FWS
Mark D. Koneff – FWS
Brian R. Lubinski - FWS
Charles W. Roberts - FWS
Brad S. Shults - NPS
Philip P. Thorpe - FWS
Mike L. Wade - FWS

******

Airward

Adam Goeden - BLM
Katie Lash - BLM
John Petroff - BLM
Diane M. Pryce - BLM
Trevino Stevens, Sr. - BIA
Angela Wittenberg - BLM
Ben York III –

U.S. Department of the Interior

Aviation Safety Review FY 03

Section I
FY 03 Aviation Accidents - Summaries

Section II
Aviation Accidents - Follow-up

Section III
Accident Statistics and Trends

Section IV
Aviation Safety Communique (SAFECOM)

Section I

FY 03 Aviation Accidents

The Department of the Interior flew 83,406.4 hours at a cost of $88,352,884.55 during the past fiscal year. Interior recorded four statistically accountable aircraft accidents at an annual rate of 4.79 per 100,000 flight hours. The FY 03 accident rate is relatively low as compared to DOI's previous performance. Note that DOI's accident rate for FY 03 is the fourth lowest in 30 fiscal years. The lowest annual rate for DOI aviation operations was 3.73 accidents per 100,000 flight hours in FY 85.

Interior's historical accident rate of 8.55 per 100,000 flight hours continues to improve from its initial rate of 18.87 in FY 75.

The National Transportation Safety Board (NTSB) investigated all four of the Department's accidents. The Aviation Management Directorate, Aviation Safety Office participated in these investigations and provided assistance.

The Aviation Management Directorate, Aviation Safety Office also conducted a safety investigation of a an accident that occurred on January 17, 2003, involving a Bell 212 helicopter, which sustained substantial damage during an in-flight collision with terrain following a loss of engine power while hovering with an external load about 40 miles north of McMurdo Station, Antarctica. The helicopter was being operated by the National Science Foundation's Antarctica Mission, as a public use flight when the accident occurred. The helicopter and pilot were provided under a Department of the Interior contract. This event was not a DOI-statistically accountable accident.

In addition, the Aviation Management Directorate, Aviation Safety Office conducted a safety investigation of an accident that occurred at Las Vegas, New Mexico on June 22, 2003, involving an Air Tractor AT-802A under the operational control of the State of New Mexico Forestry Division. This event was also not a DOI-reportable accident.

Mishap investigations often reveal important information that may improve working conditions or mishap prevention measures. In cooperation with the NTSB, key issues associated with each accident have been identified and are included in this report. These issues are based on facts discovered during the investigations and may or may not be included in the final reports. We feel this information is important and will provide our aviation community with timely information necessary to help prevent future accidents.

The four Interior accidents involved two airplanes and two helicopters. Pages 2 through 9 provide information about each of the mishaps.

AIRCRAFT ACCIDENT
03-3E01-O-FWS

AIRCRAFT DATA: Aviat A-1B	**DATE**: December 19, 2002
BUREAU: U.S. Fish and Wildlife Service	**LOCATION**: King Salmon, AK
INJURIES: One Fatal; One Serious	**SOURCE**: Fleet

Narrative: The tundra tire-equipped airplane was being operated as a local, visual flight rules, public use, game management flight for the purpose of locating moose with data collection collars. According to the airplane's operator, a typical flight would require the pilot and observer to locate a collared moose, and then fly in the immediate vicinity of the moose to enable the equipment aboard the airplane to relay data from the moose's collar to a ground-based data collection site. There was no data transmission in progress at the time of the accident, however fresh moose footprints were observed within 50 yards of the accident site. An on-site inspection of the airplane disclosed ground scars and crush lines on the airplane consistent with a near-vertical impact. The inspection disclosed no evidence of any pre-impact mechanical anomalies with the airframe or engine, and a readout of data stored in the engine monitoring system installed on the airplane indicated that the engine had adequate fuel flow and combustion. The observer received head injuries in the accident, and was unable to provide any information about the accident.

Key Issues	Discussion
• Risk Management Strengths	The five-point restraint system enhanced the passenger's chance for survival. Good adaptation of the Interagency Aviation Mishap Response Plan.
• Risk Management Weaknesses	Should Automated Flight Following systems be required for aircraft operating in remote or hostile environments? Should the frequency of flight following reports be adjusted for missions in remote areas if Automated Flight Following is not available? Would a 406 MHz Emergency Locator Beacon (ELT) and/or Personal Locator Beacon (PLB) have improved the timeliness of this rescue (or future searches)? …following an accident should ELTs and PLBs be operated at the same time? Was it a good risk decision to conduct this mission with winds of 34-47 mph, and a pilot with less than 30 hours in the aircraft? Could the pilot have been subject to negative habit transfer due to his extensive experience in other aircraft? Should the use of flight helmets be required for special-use missions below 500 feet AGL? What risk controls should apply to Departmental personnel involved in SAR missions?

Probable Cause: The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's failure to maintain adequate airspeed, which resulted in an in-flight collision with terrain.

Contributing Factors: None.

AIRCRAFT ACCIDENT
03-3E02-O-LLM

AIRCRAFT DATA: Cessna 185	**DATE**: May 28, 2003
BUREAU: Bureau of Land Management	**LOCATION**: Fairbanks, Alaska
INJURIES: Two Uninjured	**SOURCE**: Fleet

Narrative: The airline transport certificated pilot was performing a full stop landing in a tailwheel and tundra tire-equipped airplane with a 15-knot right quartering crosswind. The pilot reported that during the landing, as the tailwheel touched the runway, the right wing began to rise. He added engine power to abort the landing, but the left wing struck the runway as the airplane became airborne. The pilot then performed an uneventful landing. An examination of the left wing disclosed damage to the outboard left wing rib, and the outboard left aileron rib.

Key Issues	Discussion
• Risk Management Strengths	Immediate notification of the local supervisor and AMD.
• Risk Management Weaknesses	Would a better risk management decision have been to hire experienced C185 pilot(s) as opposed to qualifying new pilots considering the challenging flight characteristics of the Cessna 185 modified with the Robertson STOL kit? Was this (local orientation) flight necessary? …would supervisor involvement have identified the risks of the high crosswind? …was blanket approval to fly appropriate for this recently qualified pilot? Should pilots (or others) be qualified with limitations? …no passengers until 10 hours in make and model? …don't land in strong crosswinds? If there are limitations, how should they be documented? Why would the pilot violate known limitations? …no passengers until 10 hours in make and model? …don't land in strong crosswinds? …allowing an unqualified pilot to fly the airplane? How could the pilot have reduced the risks of landing in such a strong crosswind? Was the use of full flaps a habit transferred from flying other aircraft? Were there alternatives to landing on runway 24 at Ft. Wainwright? Are the benefits of the Robertson STOL system worth their adverse crosswind characteristics? Should crewmembers involved in accidents be required to remain on-site until released by the investigator?

Probable Cause: The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's inadequate compensation for a crosswind during the landing roll.
Contributing Factors: A factor contributing to the accident was the presence of a crosswind.

AIRCRAFT ACCIDENT
03-3F03-C-BIA

AIRCRAFT DATA: Kaman K-1200	**DATE**: July 25, 2003
BUREAU: Bureau of Indian Affairs	**LOCATION**: Keller, Washington
INJURIES: One Fatal	**SOURCE**: Contract

Narrative: On July 25, 2003, approximately 1703 Pacific daylight time, a Kaman K-1200 helicopter, N314KA, registered to Superior Leasing LLC, operated by the Department of Interior (Bureau of Indian Affairs), and being flown by a commercial pilot, was destroyed following a loss of control in cruise and subsequent in flight collision with terrain within 1,000 feet of the Brush Creek fire line at the McGinnis Flats forest fire near Keller, Washington. The pilot sustained fatal injuries and a post crash fire consumed much of the rotorcraft. Visual meteorological conditions prevailed and an operational flight plan was in effect at the time. The flight, which was engaged in fire fighting operations at the McGinnis Flats forest fire, was being conducted as a public use operation by the Bureau of Indian Affairs, Department of the Interior. The rotorcraft had departed the Mt. Tolman fueling site approximately one hour previous to the accident and was commencing the fourth mission of the day. Witnesses reported hearing a change in the sound of the helicopter and a radio transmission from the pilot indicated a problem. On site examination revealed that all four rotor blades had separated near their respective hub assemblies, and all four blades were located circumferentially within a band 340 to 540 feet wide around the ground impact site. The Bambi bucket was located bearing approximately 150 degrees magnetic and 500 feet short of the ground impact site of the fuselage. The blades displayed little to no leading edge damage and all four blade flaps, although broken apart, were found in the vicinity of the blades and ground impact site. Both main rotor hubs were found north and east of the ground impact site and all eight wood blade fracture surfaces have been recovered. The wreckage is being recovered on July 31, 2003, and reconstruction of selected systems and portions of the airframe is anticipated in the near future, as well as an examination of all blade fracture surfaces and a disassembly of the Lycoming-Honeywell T5317-A turboshaft engine.

Key Issues	Discussion
• Risk Management Strengths	Good post-accident plans and processes. No discrepancies noted on the part of Mt. Tolman Fire Center personnel. Excellent support from Mt. Tolman Fire Center during the field investigation.
• Risk Management Weaknesses	Why were load calculations not being completed? Why was PPE not being utilized by the pilot?

The accident is under investigation by the NTSB; preliminary information is subject to change.

AIRCRAFT ACCIDENT
03-3F04-C-BIA

AIRCRAFT DATA: Bell 206L3	**DATE**: July 26, 2003
BUREAU: Bureau of Indian Affairs	**LOCATION**: Whiteriver, Arizona
INJURIES: Two Fatal; Two Serious	**SOURCE**: Contract

Narrative: On July 26, 2003, at 1034 mountain standard time, a Bell 206L-3, N6184D, crashed near Whiteriver, Arizona. The Bureau of Indian Affairs (BIA), Fort Apache Indian Reservation, operated the helicopter under the provisions of 14 CFR Part 91. The helicopter was destroyed. The commercial pilot and one passenger were fatally injured; two passengers sustained serious injuries. One person on the ground was not injured. The public-use flight departed the Whiteriver Airport (E24), at 1000, en route to the Wilderness Fire in the vicinity of Aspen Ridge, 12 statute miles from E24. Day visual meteorological conditions prevailed, and a BIA company flight plan had been filed. The purpose of the flight was to insert a 3-person helicopter initial attack (helitack) crew to conduct an initial attack for a wildland fire along the Aspen Ridge. The Safety Board Investigator-in-Charge (IIC) interviewed a ground witness to the accident. The helitack crewman had been dropped off at the road-landing zone (LZ), 100 yards west of the accident site. He stated that there were five people in the helicopter when they departed E24. No problems were noted with the flight to Aspen Ridge. They landed at a meadow, and two of the helitack crew exited the helicopter. The helicopter then flew up the drainage area to the LZ, where the witness exited and off-loaded fire packs and tools. He stated that the initial landing was on the front side of a small hump in the road. Prior to his exiting, the pilot moved the helicopter back to a flatter area. When the pilot repositioned the helicopter, the witness heard a knocking noise. The witness stated that the pilot took off again for the meadow. He reported that when the helicopter came back to the LZ, it was about 10-20 feet above the tree line. He estimated that the trees were about 100-feet tall. He also stated that the helicopter was flying slowly. The witness stated that he was getting ready to marshal the flight in when the helicopter flew past him, continuing up the drainage. The witness reported that he did not know why they flew past him. He looked away to do something else, and heard a noise. When he looked up he saw the helicopter spinning to the right and then lost sight with the helicopter but heard what he believed was the helicopter hitting the trees. The ground witness ran to the accident site, and rescued the survivors.

Key Issues	Discussion
• Risk Management Strengths	Excellent post-accident involvement and effort to correct deficiencies by all levels of the organization. Heroic rescue effort by HECM Trevino Stevens.
• Risk Management Weaknesses	How do we ensure relief pilots are adequately rested? Was aviation the best tool for the job considering the total risk? Was the proper level of leadership involved in the decision to use aviation? Is the Bell 206 the right tool for the job when the environment is known to be high and hot? …or are we failing to use a good tool properly? Do load calc's adequately identify ALL of the risk factors? Who is responsible to ensure ALSE requirements are complied with? …are our ALSE requirements understood? Who is qualified to inspect ALSE for serviceability? - Daily? - Post-accident? Do all Bell 206 models built since January 1981 have shoulder harnesses (with inertial reels) available for all passengers? …should we require those Bell 206s built before January 1981 to have passenger shoulder harnesses installed if they fly for us?

The accident is currently under investigation by the NTSB; preliminary information is subject to change.

Section II

FY 00, FY 01, and FY 02 Aviation Accidents - Follow-up

At the time the Annual Safety Review is published each year many accidents have not yet been finalized by the National Transportation Safety Board (NTSB). To complete the information flow, the following material pertains to accidents presented in the FY 00, FY 01, and FY 02 Aviation Safety Review.

AIRCRAFT ACCIDENT
00-0F04-C-LLM

AIRCRAFT DATA: Bell 412	**DATE**: August 13, 2000
BUREAU: Bureau of Land Management	**LOCATION**: Cold Springs, NV
INJURIES: One Fatal	**SOURCE**: Contract

Narrative: On August 13, 2000, at 1646 hours Pacific daylight time, a Bell 412, N174EH, collided with mountainous terrain while conducting a water drop on a wildfire along a ridgeline near Cold Springs, Nevada. The helicopter was operated by the Bureau of Land Management as a public-use firefighting mission under the provisions of 14 CFR Part 91, and was destroyed. The airline transport pilot sustained fatal injuries. Visual meteorological conditions prevailed for the accident flight, and a company flight plan was filed. The helicopter had departed the Twin Peaks Helibase located at Cold Springs at 1605. Weather reported by another firefighting pilot who was flying in the area at the time of the accident was about 79 degrees Fahrenheit, with winds from the north-northwest at 10-15 knots. The accident site elevation was about 6,300 feet msl. An approximate density altitude of 9,100 feet was calculated for the accident location. The accident helicopter was the lead in a flight of two helicopters that was to make a bambi bucket water drop along the ridgeline, at his discretion, with the trailing pilot also making a water drop behind the accident helicopter.

The accident is currently under investigation by the NTSB; preliminary information is subject to change.

AIRCRAFT ACCIDENT
01-1F04-C-LLM

AIRCRAFT DATA: Aero Commander 500	**DATE**: August 21, 2001
BUREAU: Bureau of Land Management	**LOCATION**: Elko, NV
INJURIES: None	**SOURCE**: Contract

Narrative: Both main landing gear collapsed about 100 feet down the runway on the landing roll. The skid ground off the belly skin and damaged several structural airframe components. One of the observers in the airplane was also a pilot. He observed three green landing gear lights, and he and the pilot both visually checked that the landing gear was down. He observed the pilot maintain one hand on the control yoke and the other on the throttle throughout the landing and landing roll. A physical check of the gear revealed no anomalies and the gear functioned normally when placed on jacks. The actuators functioned properly when checked on a test bench. The Aero Commander uses hydraulic pressure to keep the gear locked, and the landing gear handle has two positions, gear up and gear down.

Probable Cause: The National Transportation Safety Board determines that the probable cause(s) of this accident was: The main landing gear collapsed for undetermined reasons.

Contributing Factor(s): None.

AIRCRAFT ACCIDENT
02-2F03-O-FWS

AIRCRAFT DATA: Cessna TU206F	**DATE**: May 27, 2002
BUREAU: U.S. Fish and Wildlife Service	**LOCATION**: Swan River, Manitoba, Canada
INJURIES: One Minor, One Uninjured	**SOURCE**: Fleet

Narrative: On May 27, 2002, an amphibious Cessna TU206F, N753, serial no. U20603401, operated by the U.S. Department of the Interior, crashed near Swan River, Manitoba, Canada. Of the two persons on board, the pilot sustained minor injuries and passenger was not injured. The airplane was destroyed by the impact and post-crash fire. The airplane was operating in daylight, visual meteorological conditions, under the regulations and authority of CAA, Canada.

The flight was on a game observation mission in conjunction with Canadian authorities. Shortly after takeoff from runway 20 at Swan River, the pilot reportedly felt engine vibrations and observed a decrease of manifold pressure. He turned towards the airport and, unable to maintain altitude, performed a forced landing in flat, bushy, and treed terrain, about 1 mile west of the airport.

The investigation in being conducted under the authority of Transportation Safety Board, Canada. Assistance is being offered by the US Department of the Interior, Cessna Aircraft Company, and Teledyne Continental Motors (TCM).

The accident is under investigation by the Transportation Safety Board of Canada (TSB); preliminary information is subject to change.

AIRCRAFT ACCIDENT
02-2E03-O-FWS

AIRCRAFT DATA: Cessna 185 (Wheel/Ski)	**DATE**: June 7, 2002
BUREAU: U.S. Fish and Wildlife Service	**LOCATION**: Kaktovik, AK
INJURIES: Two Uninjured	**SOURCE**: Fleet

Narrative: The commercial certificated pilot was landing a wheel/ski-equipped airplane on a remote ice-covered lake. He was concluding a public use caribou tracking flight. The pilot estimated there was about 1,500 feet of usable landing area. The pilot landed toward the west with the skis extended, but began sliding on the icy surface toward an area of open water along the shore of the lake. The pilot initiated a left turn and applied engine power. The airplane's right wing and right elevator struck the ice. The airplane received damage to the right wingtip, right aileron, and the right elevator. After landing, the pilot discovered the wind was from the east about 7 knots.

Probable Cause: The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's inadequate evaluation of the weather conditions during landing at a remote lake, resulting in a downwind landing.

Contributing Factors: Factors contributing to the accident were the presence of a tailwind, and an icy lake surface.

AIRCRAFT ACCIDENT

02-2F05-A-FNP

AIRCRAFT DATA: Bell 206B-III	**DATE**: June 25, 2002
BUREAU: National Park Service	**LOCATION**: Mt. Rainier NP, WA
INJURIES: Three Uninjured	**SOURCE**: ARA

Narrative: The pilot reported that he was dispatched to Mount Rainier to provide air support for a rescue mission of an injured hiker. Load calculations prepared by the pilot indicated that the helicopter would be operating at the high end of its performance capabilities. The pilot also reported that this was his first time operating on Mount Rainier. After a briefing, the pilot took one climbing guide from one helibase, and then picked up a climbing ranger from another location before proceeding to the site where the injured hiker was located at about the 10,000 to 10,400 foot level. Since the pilot was unfamiliar with the mountain, the guide and ranger also provided assistance to the pilot in where to go. The pilot was to drop off the guide and ranger at about the 9,000 foot level. After flying over the site to survey the ground conditions on the glacier which consisted of crevasses and uneven ground from avalanche debris, and to check helicopter performance, the pilot attempted to land at several locations on the glacier between about 8,000 feet and 9,000 feet. The pilot then chose a location in which he positioned the helicopter nose into the slightly rising terrain. The climbing ranger stated that the landing skid from the aft cross tube forward was on the ground. The terrain from the aft cross tube back sloped down about 5 degrees. After the pilot set the helicopter down slowly on the ground, he used the pedals to test for compaction. The pilot stated that as he was lowering the collective, the helicopter suddenly pitched and he applied forward cyclic and lifted off the ground. The helicopter began to rotate clockwise. The pilot applied left pedal input which did not have any effect. The pilot realized that he had no tail rotor control and lowered the collective and impacted on the glacier with the nose pointing downhill. Both occupants on board the helicopter and one witness located about 500 feet above the accident site reported that after the helicopter set down, it appeared to them that the helicopter slid backwards which lowered the tail and raised the nose of the helicopter. The witness above the accident site stated that he thought that the pilot would have landed perpendicular to the terrain slope so that the skids would not act like skis when weighted and slide downhill. Prior to recovery of the helicopter from the glacier, it was lost in a crevasse and covered by snow and rock fall. The load calculation prepared by the pilot was reviewed after the accident. It was found that for the actual conditions at the accident site, the helicopter was operating from 60 to 285 pounds over its allowable load for hover out of ground effect performance.

Probable Cause: The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's failure to maintain aircraft control while trying to land.

Contributing Factors: Rough/uneven terrain, inaccurate performance data calculations, inadequate in-flight planning and lack of familiarity with the geographic area were factors.

AIRCRAFT ACCIDENT
02-2F06-C-LLM

AIRCRAFT DATA: WSK PZL Mielec M-18A	**DATE**: July 7, 2002
BUREAU: Bureau of Land Management	**LOCATION**: Fillmore, UT
INJURIES: One Minor	**SOURCE**: Exclusive Use Contract

Narrative: The airplane took off and was en route to a nearby forest fire. The pilot said the takeoff roll was "a little longer" than usual, which he attributed to the high temperature. He noticed a lower propeller rpm (1 to 2 inches) and manifold pressure, and the airplane was in a 50 to 100 foot per minute rate of descent. He realized he needed to jettison the retardant, and made several unsuccessful attempts to use the emergency jettison handle. While his attention was diverted to jettisoning the load, the airplane collided with terrain. The pilot failed to disengage the emergency release (jettison) handle-locking lever prior to takeoff as required by the Pilot Operating Handbook. He also chose not to arm the hydraulic power for the retardant gate prior to takeoff. When examined at the accident site, the slurry mixture was of a "very thick consistency." The pilot said he mixed and loaded the slurry, called Fire-Trol, into the airplane. The slurry consisted of ammonium phosphate, a clay thickener, corrosion inhibitor, and colorant. A sample of the slurry, removed from the sealed pump hose, was tested and found to be LCA-R (concentrated retardant unmixed with water). The sample weighed 12.2 pounds per gallon, slightly heavier than pure concentrate (12.1 pounds per gallon). No water was found in the sample. When properly mixed, the slurry concentrate should weigh 9.13 pounds per gallon. The airplane's hopper held 400 gallons. A properly mixed load should weigh 3,652 pounds. It was computed that the hopper's payload weighed 4,880 pounds at the time of the accident, a difference of 1,228 pounds.

Probable Cause: The National Transportation Safety Board determines the probable cause(s) of this accident as follows: The pilot's failure to follow proper procedures/directives, and the airplane's inability to climb while maneuvering after takeoff.

Contributing Factors: Factors contributing to the accident were improperly mixed aerial application materials (fire retardant slurry), the high aircraft weight and balance, and the pilot's diverted attention.

Section III

Accident Statistics and Trends - Introduction

This section of the review presents a statistical overview of aviation accidents, incidents, and flight times within the Department of the Interior (DOI). Whenever possible, total flight times and accidents are subdivided into fleet, contract, and rental aircraft. Historical records from previous years are also included for comparison.

The statistics are divided into two major parts. The first reflects DOI accident history and rates from FY 75 to FY 03. Several comparisons are presented using data collected from FY 99 through FY 03. The last section reviews events reported through the SAFECOM reporting system.

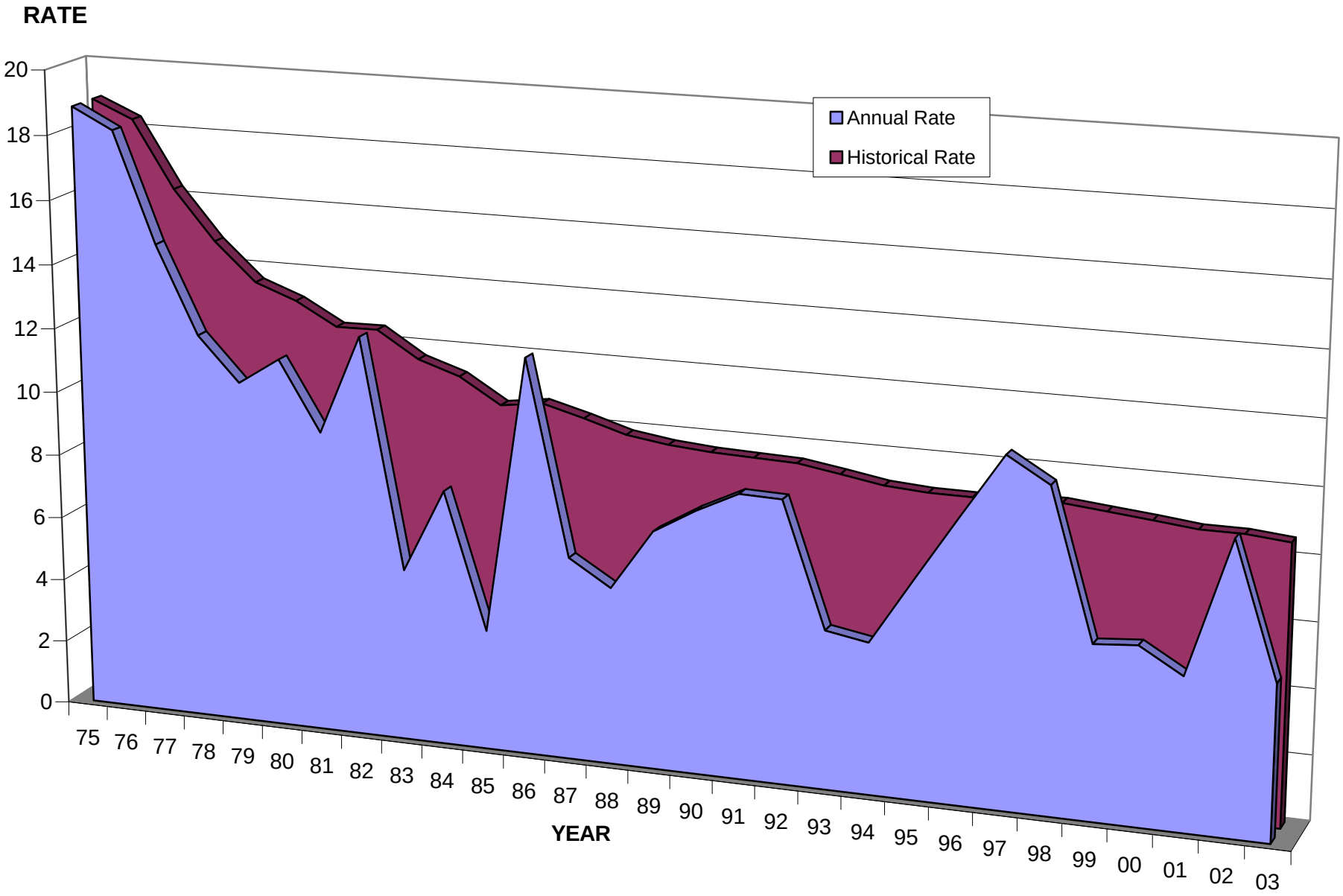
All accident rates in this report are based on 100,000 flight hours. They are determined by dividing the number of accidents by the flight hours, then multiplying that number by 100,000. The historical average is determined by dividing the total number of accidents by the total flight hours recorded since FY 75, then multiplying that number by 100,000.

Historical Records from FY 75 to FY 03

In FY 03 the Department of the Interior flew 83,406.4 hours. Interior recorded four statistically accountable aircraft accidents for an annual rate of 4.79 per 100,000 flight hours.

Graph 1/Table 1	ACCIDENT RATE HISTORY. A comparison of annual and historical accident rates from FY 75 through FY 03
Graph 2/Table 2	TOTAL FLIGHT HOURS. A comparison of annual flight hours, which are subdivided according to the source (Fleet, Rental, and Contract). The historical column reflects cumulative flight times.
Graph 3/Table 3	FATAL ACCIDENT RATE HISTORY. A summary of annual and historical rates from FY 75 through FY 03.
Graph 4/Table 4	FATALITY RATE HISTORY. A comparison of annual and historical fatality rates from FY 75 through FY 03.
Graph 5/Table 5	BUREAU FLIGHT HOURS. A comparison of bureau flight hours for FY 03 BUREAU STATISTICS. Bureau flight hours and accidents from FY 99 to FY 03.
Graph 6	SOURCE COMPARISONS. A comparison of flight hours, accidents, and accident rates by source (Fleet, Rental, and Contract) from FY 99 to FY 03.
Graph 7	AIRCRAFT COMPARISONS. A comparison of airplane and helicopter accidents and accident rates from FY 99 to FY 03. Graph 7a - AIRPLANE PHASE OF FLIGHT COMPARISONS. A comparison of number of airplane accidents per phase of flight FY 99 to FY 03. Graph 7b- HELICOPTER PHASE OF FLIGHT COMPARISONS. A comparison of number of helicopter accidents per phase of flight from FY 99 to FY 03.
Graph 8	FATAL ACCIDENT COMPARISONS. A comparison of airplane and helicopter fatal accidents and fatal accident rates from FY 99 to FY 03.

ACCIDENT RATE HISTORY



	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
Annual Rate	18.87	18.22	14.81	12.10	10.73	11.57	9.41	12.49	5.36	7.96	3.73	12.30	6.29	5.50	7.37	8.14	8.78	8.74	4.91	4.68	6.72	8.73	10.71	9.95	5.37	5.48	4.71	8.91	4.79
Historical Rate	18.87	18.32	16.25	14.73	13.56	13.09	12.39	12.41	11.60	11.19	10.41	10.59	10.25	9.86	9.68	9.58	9.53	9.49	9.28	9.07	8.98	8.97	9.03	9.06	8.94	8.81	8.67	8.67	8.55

Graph 1

Accident rate per 100,000 flight hours.

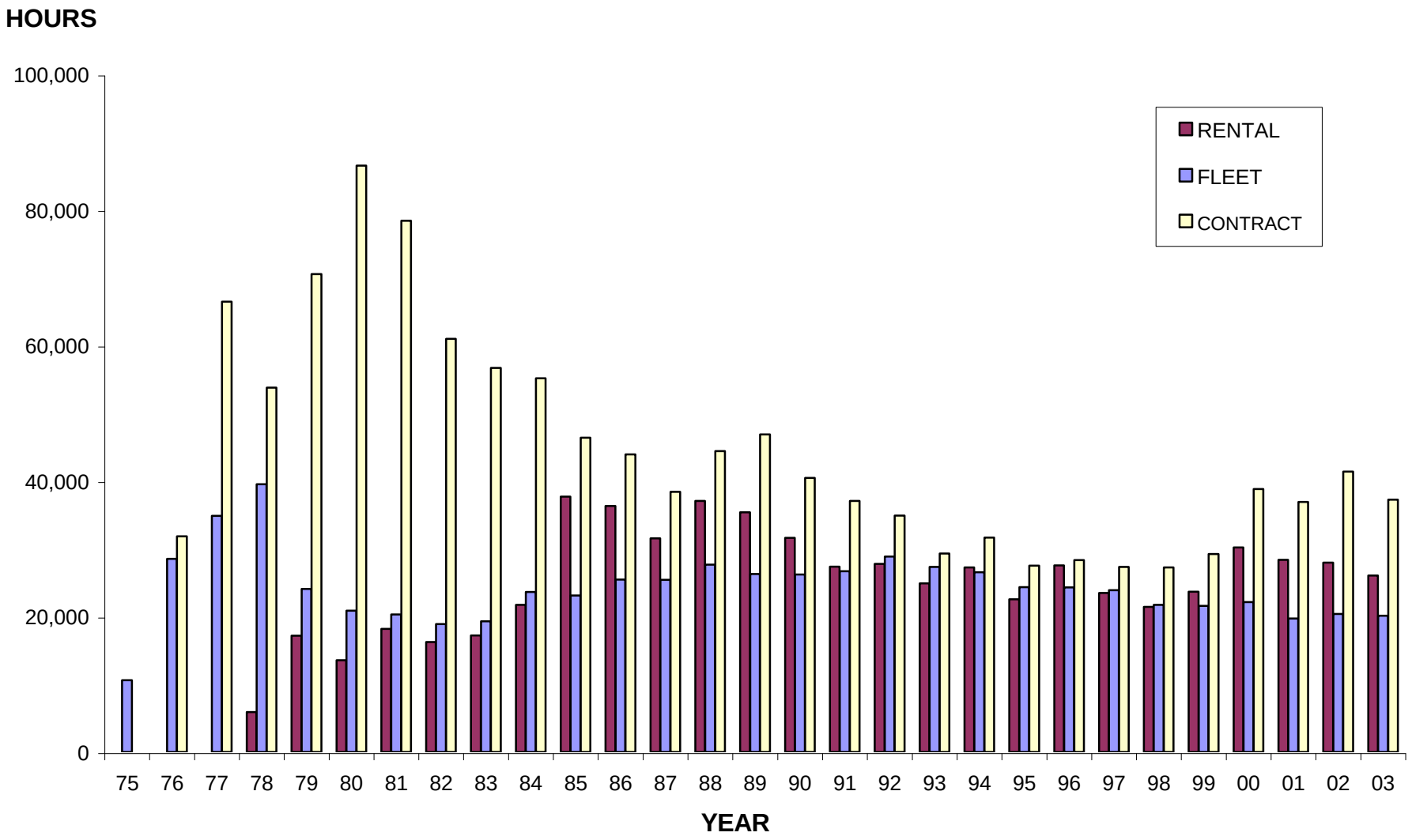
ACCIDENT RATE HISTORY

	Rental		Fleet		Contract		Total (Annual)			Total (Historical)		
Year	Accident	Rate	Accident	Rate	Accident	Rate	Accident	Accident *	Rate	Accident	Accident*	Rate
75	0	0.00	2	18.87	n/a**	n/a	2	4	18.87	2	4	18.87
76	0	0.00	3	10.51	8	25.13	11	7	18.22	13	11	18.32
77	0	0.00	4	11.47	11	16.56	15	4	14.81	28	15	16.25
78	0	0.00	4	10.12	8	14.87	12	2	12.10	40	17	14.73
79	1	5.82	3	12.46	8	11.34	12	6	10.73	52	23	13.56
80	0	0.00	6	28.75	8	9.24	14	2	11.57	66	25	13.09
81	1	5.50	1	4.92	9	11.48	11	1	9.41	77	26	12.39
82	1	6.16	6	31.79	5	8.20	12	1	12.49	89	27	12.41
83	1	5.81	0	0.00	4	7.06	5	1	5.36	94	28	11.60
84	2	9.20	1	4.23	5	9.06	8	2	7.96	102	30	11.19
85	1	2.65	1	4.32	2	4.31	4	4	3.73	106	34	10.41
86	2	5.51	4	15.72	7	15.94	13	3	12.30	119	37	10.59
87	0	0.00	3	11.80	3	7.81	6	0	6.29	125	37	10.25
88	3	8.10	2	7.23	1	2.25	6	0	5.50	131	37	9.86
89	3	8.48	2	7.61	3	6.40	8	2	7.37	139	39	9.68
90	5	15.82	1	3.82	2	4.94	8	0	8.14	147	39	9.58
91	6	21.93	2	7.50	0	0.00	8	1	8.78	155	40	9.53
92	0	0.00	8	27.74	0	0.00	8	0	8.74	163	40	9.49
93	2	8.04	1	3.66	1	3.41	4	2	4.91	167	42	9.28
94	1	3.67	2	7.53	1	3.16	4	0	4.68	171	42	9.07
95	3	13.30	1	4.11	1	3.63	5	1	6.72	176	43	8.98
96	2	7.26	4	16.46	1	3.53	7	0	8.73	183	43	8.97
97	2	8.52	4	16.73	2	7.32	8	0	10.71	191	43	9.03
98	2	9.34	2	9.20	3	11.02	7	1	9.95	198	44	9.06
99	1	4.22	1	4.63	2	6.84	4	1	5.37	202	45	8.94
00	2	6.62	1	4.51	2	5.15	5	0	5.48	207	45	8.81
01	0	0.00	3	15.23	1	2.70	4	0	4.71	211	45	8.67
02	2	7.15	4	19.65	2	4.83	8	0	8.91	219	45	8.67
03	0	0.00	2	9.95	2	5.36	4	0	4.79	223	45	8.55
Total	**43**	**6.53**	**78**	**11.11**	**102**	**8.17**	**223**	**45**	**8.55**			

* Non-Chargeable accidents

** Contract flight hours not available in 1975.

TOTAL FLIGHT HOURS

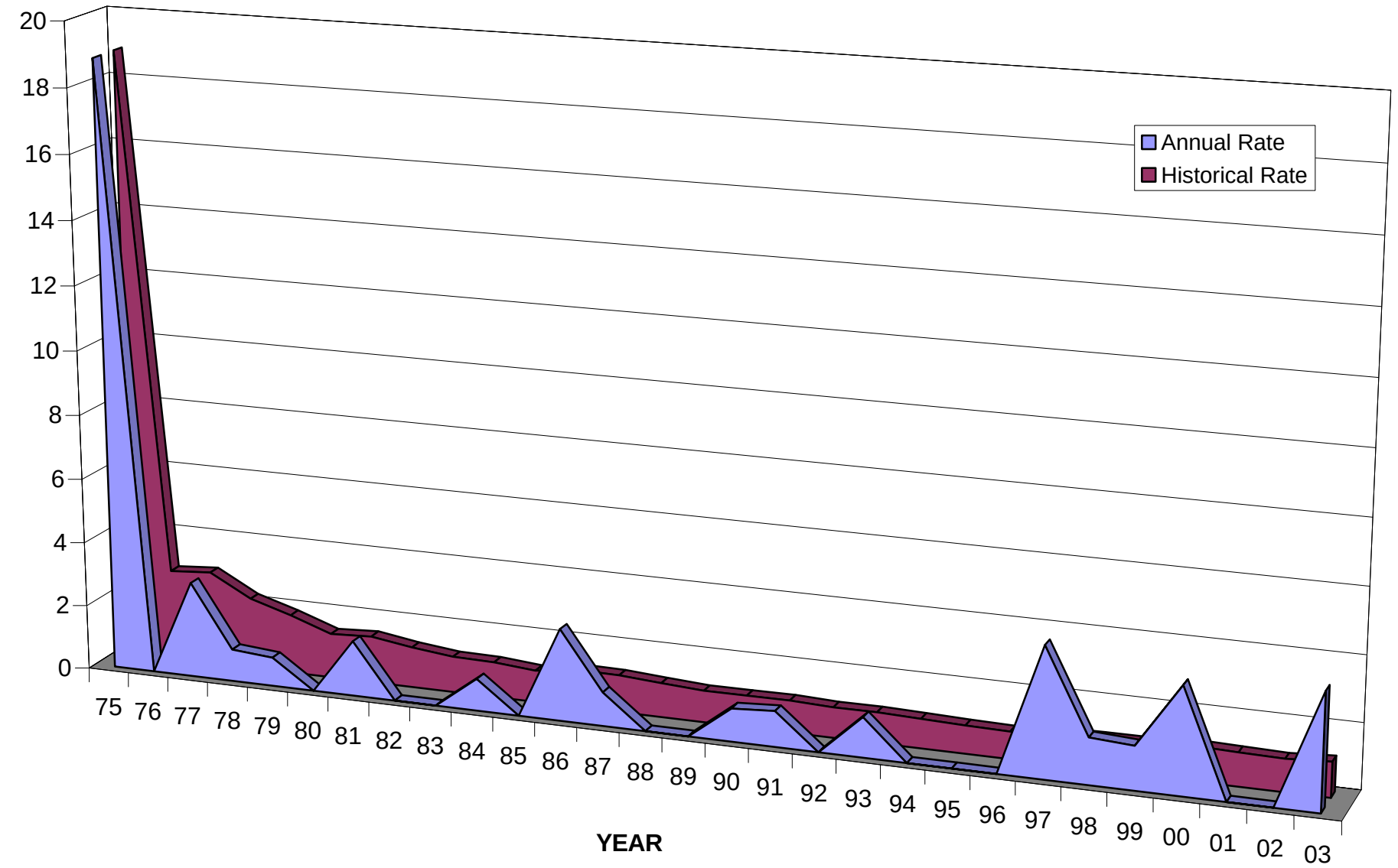


TOTAL FLIGHT HOURS

Year	Rental	Fleet	Contract	Total (Annual)	Total (Historical)
75	0.0	10,598.8	n/a*	10,598.8	10,598.8
76	0.0	28,523.4	31,833.4	60,356.8	70,955.6
77	0.0	34,865.2	66,442.1	101,307.3	172,262.9
78	5,890.0	39,528.1	53,784.9	99,203.0	271,465.9
79	17,180.8	24,072.7	70,528.1	111,781.6	383,247.5
80	13,551.9	20,865.6	86,515.1	120,932.6	504,180.1
81	18,173.0	20,284.4	78,381.5	116,838.9	621,019.0
82	16,223.5	18,876.4	60,953.0	96,052.9	717,071.9
83	17,193.1	19,286.5	56,694.9	93,174.5	810,246.4
84	21,727.4	23,605.8	55,143.1	100,476.3	910,722.7
85	37,686.3	23,095.5	46,396.4	107,178.2	1,017,900.9
86	36,321.0	25,431.7	43,909.8	105,662.5	1,123,563.4
87	31,514.7	25,408.9	38,397.4	95,321.0	1,218,884.4
88	37,036.9	27,667.3	44,401.7	109,105.9	1,327,990.3
89	35,357.9	26,283.9	46,853.0	108,494.8	1,436,485.1
90	31,603.4	26,188.2	40,462.7	98,254.3	1,534,739.4
91	27,360.9	26,660.7	37,051.5	91,073.1	1,625,812.5
92	27,763.2	28,834.8	34,885.9	91,483.9	1,717,296.4
93	24,890.4	27,317.2	29,288.6	81,496.2	1,798,792.6
94	27,240.4	26,533.5	31,640.8	85,414.7	1,884,207.3
95	22,547.1	24,325.7	27,514.6	74,387.4	1,958,594.7
96	27,530.4	24,300.7	28,328.9	80,160.0	2,038,754.7
97	23,462.5	23,895.7	27,313.0	74,671.2	2,113,425.9
98	21,415.8	21,734.9	27,227.2	70,377.9	2,183,803.8
99	23,645.6	21,573.6	29,205.5	74,424.7	2,258,228.5
00	30,171.6	22,137.6	38,787.7	91,096.9	2,349,325.4
01	28,374.2	19,694.3	36,907.5	84,976.0	2,434,301.4
02	27,965.9	20,355.9	41,381.6	89,703.4	2,524,004.8
03	26,044.5	20,108.6	37,253.3	83,406.4	2,607.411.2
Total	**657,872.4**	**702,055.6**	**1,247,483.2**	**2,607,411.2**	

* Contract flight hours not available in 1975.

FATAL ACCIDENT RATE HISTORY



	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
Annual Rate	18.87	0.00	2.96	1.00	0.89	0.00	1.71	0.00	0.00	0.99	0.00	2.84	1.04	0.00	0.00	1.02	1.10	0.00	1.23	0.00	0.00	0.00	4.01	1.42	1.34	3.29	0.00	0.00	3.59
Historical Rate	18.87	2.81	2.90	2.21	1.83	1.38	1.45	1.26	1.11	1.09	0.98	1.16	1.14	1.05	0.97	0.98	0.98	0.93	0.94	0.90	0.86	0.83	0.94	0.96	0.97	1.06	1.02	0.99	1.07

Accident rate per 100,000 flight hours

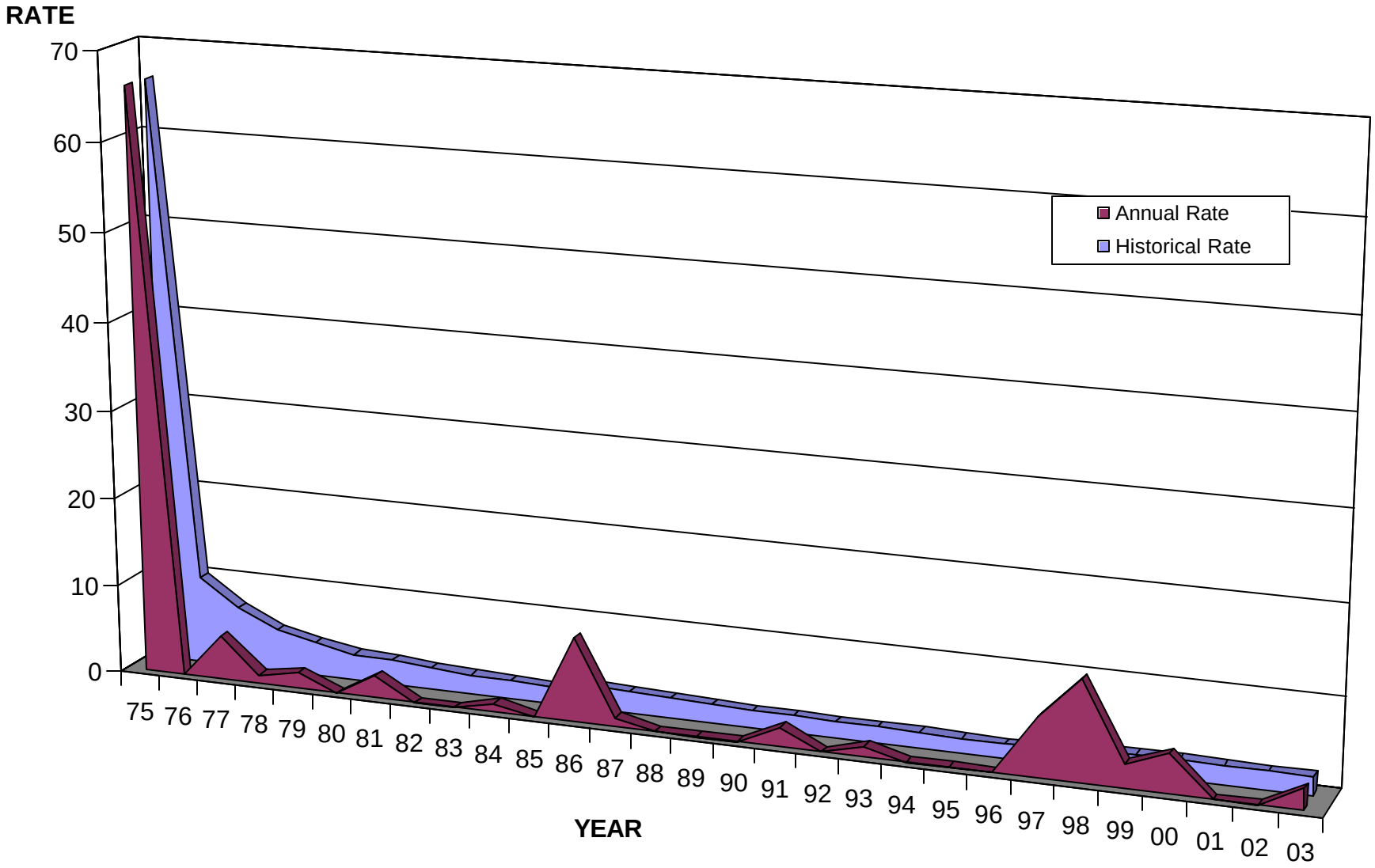
FATAL ACCIDENT RATE HISTORY

	Rental		Fleet		Contract		Total (Annual)			Total (Historical)		
Year	Accident	Rate	Accident	Rate	Accident	Rate	Accident	Accident *	Rate	Accident	Accident *	Rate
75	0	0.00	2	18.87	0	n/a**	2	1	18.87	2	1	18.87
76	0	0.00	0	0.00	0	0.00	0	3	0.00	2	4	2.81
77	0	0.00	0	0.00	3	4.51	3	0	2.96	5	4	2.90
78	0	0.00	1	2.53	0	0.00	1	1	1.00	6	5	2.21
79	0	0.00	1	4.15	0	0.00	1	0	0.89	7	5	1.83
80	0	0.00	0	0.00	0	0.00	0	2	0.00	7	7	1.38
81	0	0.00	0	0.00	2	2.55	2	0	1.71	9	7	1.45
82	0	0.00	0	0.00	0	0.00	0	0	0.00	9	7	1.26
83	0	0.00	0	0.00	0	0.00	0	0	0.00	9	7	1.11
84	1	4.60	0	0.00	0	0.00	1	1	0.99	10	8	1.09
85	0	0.00	0	0.00	0	0.00	0	1	0.00	10	9	0.98
86	1	2.75	0	0.00	2	4.55	3	0	2.84	13	9	1.16
87	0	0.00	0	0.00	1	2.60	1	0	1.04	14	9	1.14
88	0	0.00	0	0.00	0	0.00	0	0	0.00	14	9	1.05
89	0	0.00	0	0.00	0	0.00	0	0	0.00	14	9	0.97
90	1	3.16	0	0.00	0	0.00	1	0	1.02	15	9	0.98
91	1	3.65	0	0.00	0	0.00	1	0	1.10	16	9	0.98
92	0	0.00	0	0.00	0	0.00	0	0	0.00	16	9	0.93
93	1	4.02	0	0.00	0	0.00	1	2	1.23	17	11	0.94
94	0	0.00	0	0.00	0	0.00	0	0	0.00	17	11	0.90
95	0	0.00	0	0.00	0	0.00	0	1	0.00	17	12	0.86
96	0	0.00	0	0.00	0	0.00	0	0	0.00	17	12	0.83
97	0	0.00	1	4.18	2	7.32	3	0	4.01	20	12	0.94
98	1	4.67	0	0.00	0	0.00	1	0	1.42	21	12	0.96
99	1	4.22	0	0.00	0	0.00	1	0	1.34	22	12	0.97
00	1	3.31	0	0.00	2	5.15	3	0	3.29	25	12	1.06
01	0	0.00	0	0.00	0	0.00	0	0	0.00	25	12	1.02
02	0	0.00	0	0.00	0	0.00	0	0	0.00	25	12	0.99
03	0	0.00	1	4.97	2	2.40	3	0	3.59	28	0	1.07
Total	**8**	**1.21**	**6**	**0.85**	**14**	**1.12**	**28**	**12**	**1.07**			

* Non-chargeable fatal accidents.

** Contract flight hours not available in 1975.

FATALITY RATE HISTORY



	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
Annual Rate	66.0	0.00	4.94	1.00	1.79	0.00	2.56	0.00	0.00	0.99	0.00	9.46	1.04	0.00	0.00	0.00	2.20	0.00	1.23	0.00	0.00	0.00	6.69	11.3	2.68	4.39	0.00	0.00	2.39
Historical Rate	66.0	9.87	6.97	4.79	3.91	2.98	2.89	2.51	2.22	2.08	1.86	2.58	2.46	2.26	2.09	1.95	1.97	1.86	1.83	1.75	1.68	1.62	1.80	2.11	2.12	2.21	2.13	2.06	2.07

Fatality rate per 100,000 flight hours

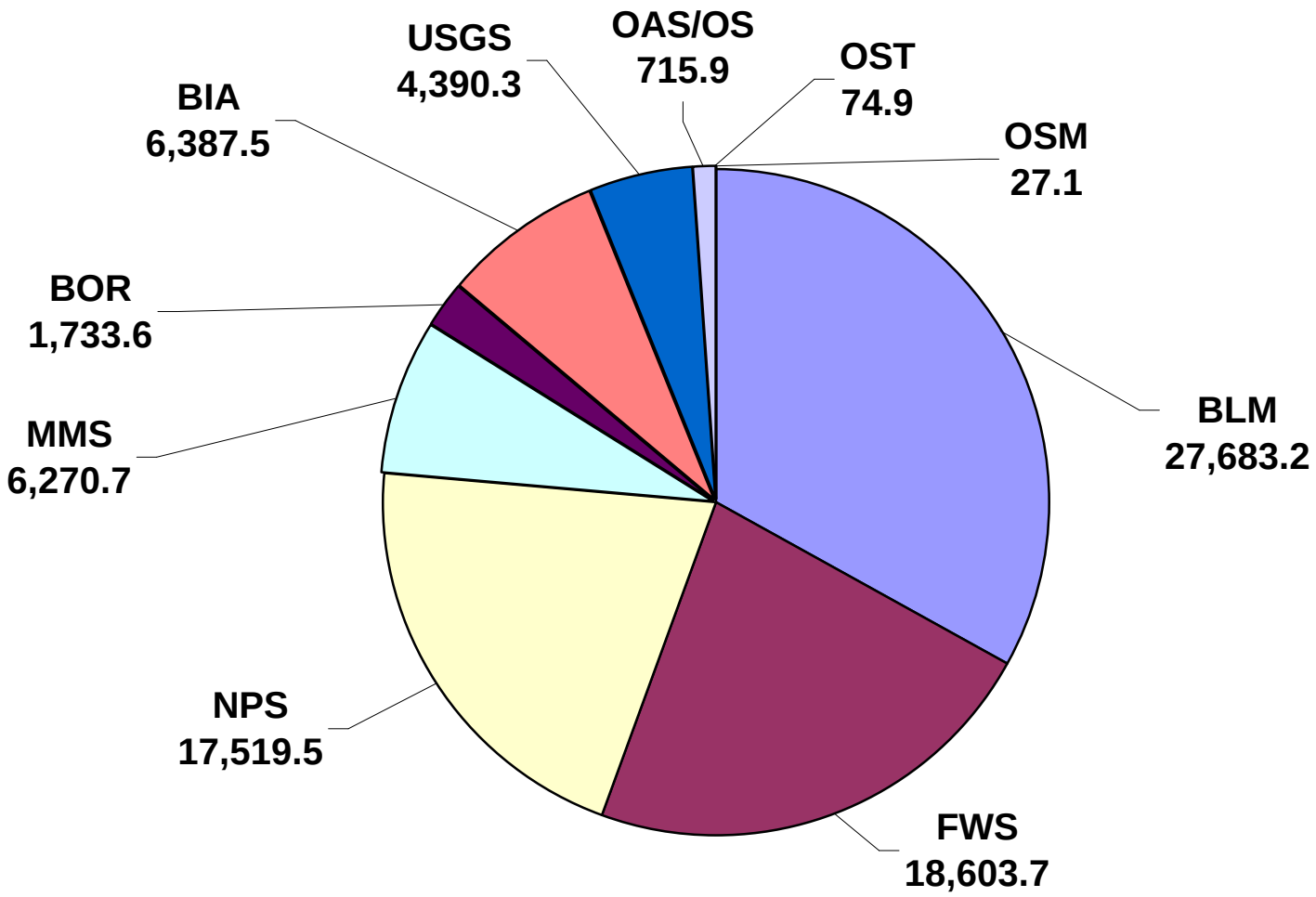
FATALITY RATE HISTORY

	Rental		Fleet		Contract		Total (Annual)			Total (Historical)		
Year	**Fatalities**	**Rate**	**Fatalities**	**Rate**	**Fatalities**	**Rate**	**Fatalities**	**Fatalities***	**Rate**	**Fatalities**	**Fatalities***	**Rate**
75	0	0.00	7	66.04	0	n/a*	7	3	66.04	7	3	66.04
76	0	0.00	0	0.00	0	0.00	0	13	0.00	7	16	9.87
77	0	0.00	0	0.00	5	7.52	5	0	4.94	12	16	6.97
78	0	0.00	1	2.53	0	0.00	1	1	1.00	13	17	4.79
79	0	0.00	2	8.31	0	0.00	2	0	1.79	15	17	3.91
80	0	0.00	0	0.00	0	0.00	0	5	0.00	15	22	2.98
81	0	0.00	0	0.00	3	3.82	3	2	2.56	18	24	2.89
82	0	0.00	0	0.00	0	0.00	0	0	0.00	18	24	2.51
83	0	0.00	0	0.00	0	0.00	0	0	0.00	18	24	2.22
84	1	4.60	0	0.00	0	0.00	1	2	0.99	19	26	2.08
85	0	0.00	0	0.00	0	0.00	0	1	0.00	19	27	1.86
86	4	11.01	0	0.00	6	13.66	10	4	9.46	29	31	2.58
87	0	0.00	0	0.00	1	2.60	1	1	1.04	30	32	2.46
88	0	0.00	0	0.00	0	0.00	0	0	0.00	30	32	2.26
89	0	0.00	0	0.00	0	0.00	0	0	0.00	30	32	2.09
90	0	0.00	0	0.00	0	0.00	0	1	0.00	30	33	1.95
91	2	7.31	0	0.00	0	0.00	2	1	2.20	32	34	1.97
92	0	0.00	0	0.00	0	0.00	0	0	0.00	32	34	1.86
93	1	4.02	0	0.00	0	0.00	1	4	1.23	33	38	1.83
94	0	0.00	0	0.00	0	0.00	0	0	0.00	33	38	1.75
95	0	0.00	0	0.00	0	0.00	0	1	0.00	33	39	1.68
96	0	0.00	0	0.00	0	0.00	0	0	0.00	33	39	1.62
97	0	0.00	1	4.18	4	14.65	5	2	6.69	38	41	1.80
98	8	37.36	0	0.00	0	0.00	8	1	11.36	46	42	2.11
99	2	8.45	0	0.00	0	0.00	2	0	2.68	48	42	2.12
00	3	9.94	0	0.00	1	2.57	4	2	4.39	52	44	2.21
01	0	0.00	0	0.00	0	0.00	0	0	0.00	52	44	2.13
02	0	0.00	0	0.00	0	0.00	0	0	0.00	52	44	2.06
03	0	0.00	1	4.97	1	2.68	2	2	2.39	54	46	2.07
Total	**21**	**3.19**	**12**	**1.70**	**21**	**1.68**	**54**	**46**	**2.07**			

* Non-DOI fatalities associated with DOI aircraft accidents.

** Contract flight hours not available in 1975.

BUREAU FLIGHT HOURS
FY 03



Total flight hours - 83,406.4

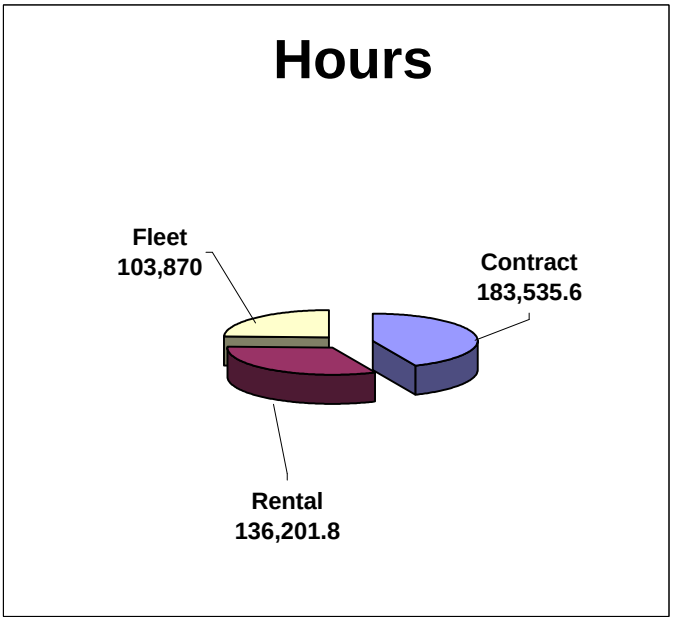
BUREAU STATISTICS

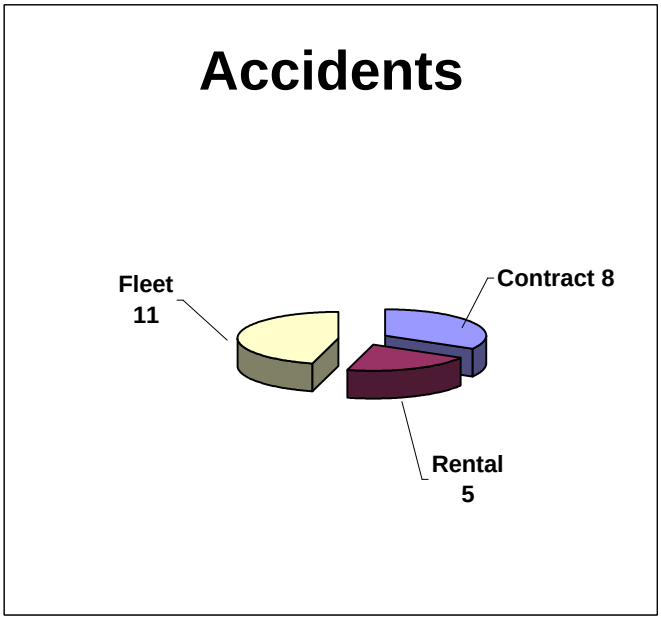
5 YEAR HISTORY

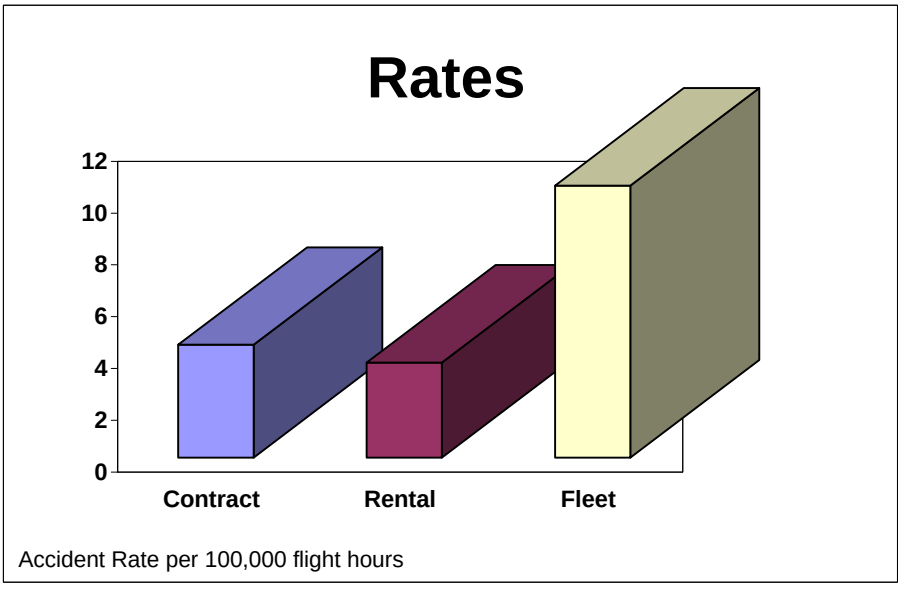
Bureau	Statistic	FY 99	FY 00	FY01	FY02	FY03	TOTAL
BLM	Hours	20,780.8	31,422.1	29,178.5	31,740.8	27,683.2	140,805.4
	Accidents	2(1)	3	2	1	1	9(1)
	Rate	9.6	9.5	6.8	3.2	3.6	6.4
FWS	Hours	17,209.5	19,117.9	17,783.8	18,498.6	18,603.7	91,213.5
	Accidents	1	1	1	4	1	8
	Rate	5.8	5.2	5.6	21.6	5.3	8.7
NPS	Hours	18,177.5	19,283.1	17,999.1	17,555.3	17,519.5	90,534.5
	Accidents	0	1	1	1	0	3
	Rate	0.0	5.2	5.6	5.7	0.0	3.3
MMS	Hours	6,537.2	7,574.9	6,988.6	7,493.8	6,270.7	34,865.2
	Accidents	0	0	0	0	0	0
	Rate	0.0	0.0	0.0	0.0	0.0	0.0
BOR	Hours	2,978.6	2,510.8	2,236.7	1,963.7	1,733.6	11,423.4
	Accidents	0	0	0	0	0	0
	Rate	0.0	0.0	0.0	0.0	0.0	0.0
BIA	Hours	4,083.5	5,714.3	4,488.9	7,093.7	6,387.5	27,767.9
	Accidents	0	0	0	0	2	2
	Rate	0.0	0.0	0.0	0.0	31.3	7.2
USGS	Hours	4,004.2	4,769.2	5,507.1	4,596.5	4,390.3	23,267.3
	Accidents	0	0	0	2	0	2
	Rate	0.0	0.0	0.0	43.5	0.0	8.5
OAS/OS	Hours	619.5	662.0	730.7	711.7	715.9	3,439.8
	Accidents	1	0	0	0	0	1
	Rate	161.4	0.0	0.0	0.0	0.0	29.0
OSM	Hours	33.9	42.6	62.6	49.3	27.1	215.5
	Accidents	0	0	0	0	0	0
	Rate	0	0	0	0	0	0
OST	Hours	0	0	0	0	74.9	74.9
	Accidents	0	0	0	0	0	0
	Rate	0	0	0	0	0	0
TOTAL	Hours	74,424.7	91,096.9	84,976.0	89,703.4	83,406.4	423,607.4
	Accidents	4(1)	5	4	8	4	25(1)
	Rate	5.3	5.5	4.7	8.6	4.8	5.9

( ) Indicates non-accountable accidents or non-chargeable accidents.

SOURCE COMPARISONS
FY 99 - FY 03

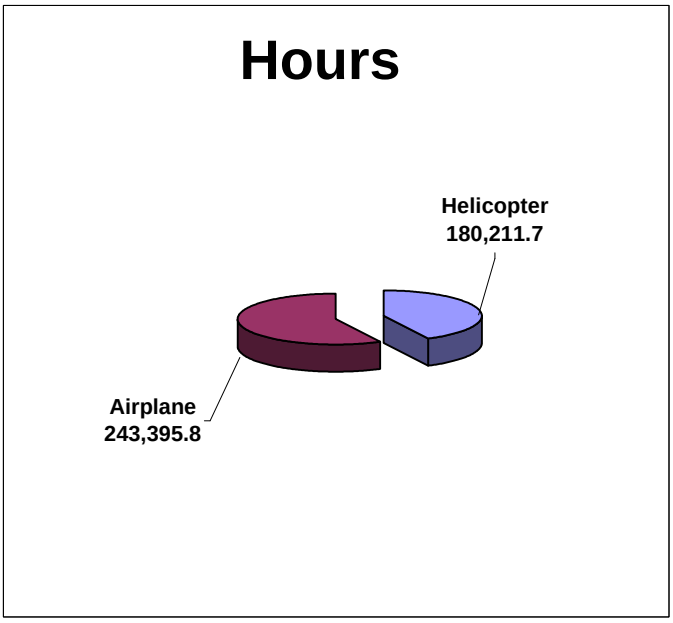


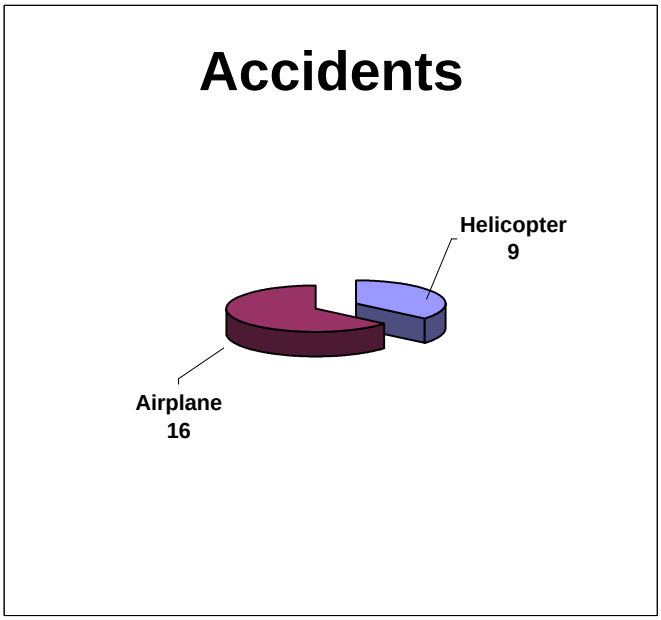


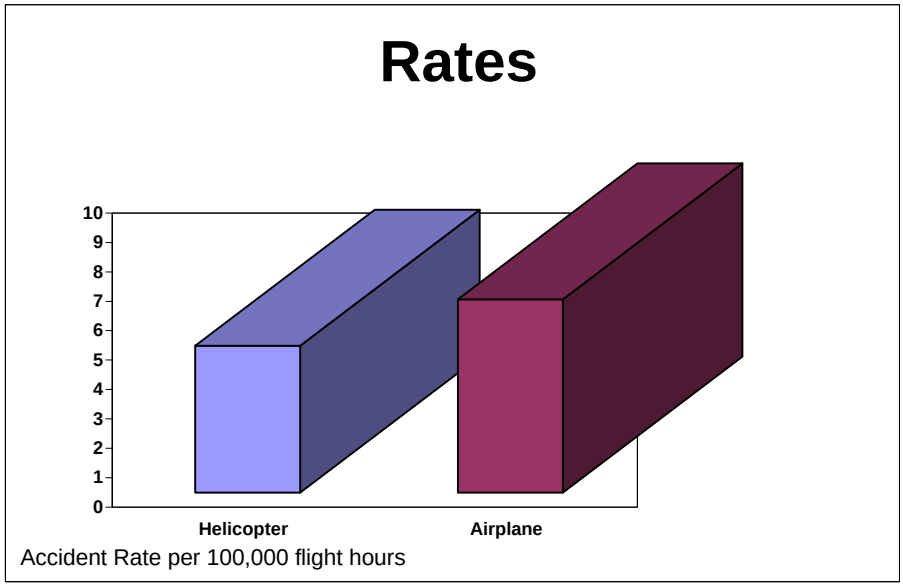


Contract = 4.4
Rental = 3.7
Fleet = 10.5

AIRCRAFT COMPARISONS
FY 99 - FY 03

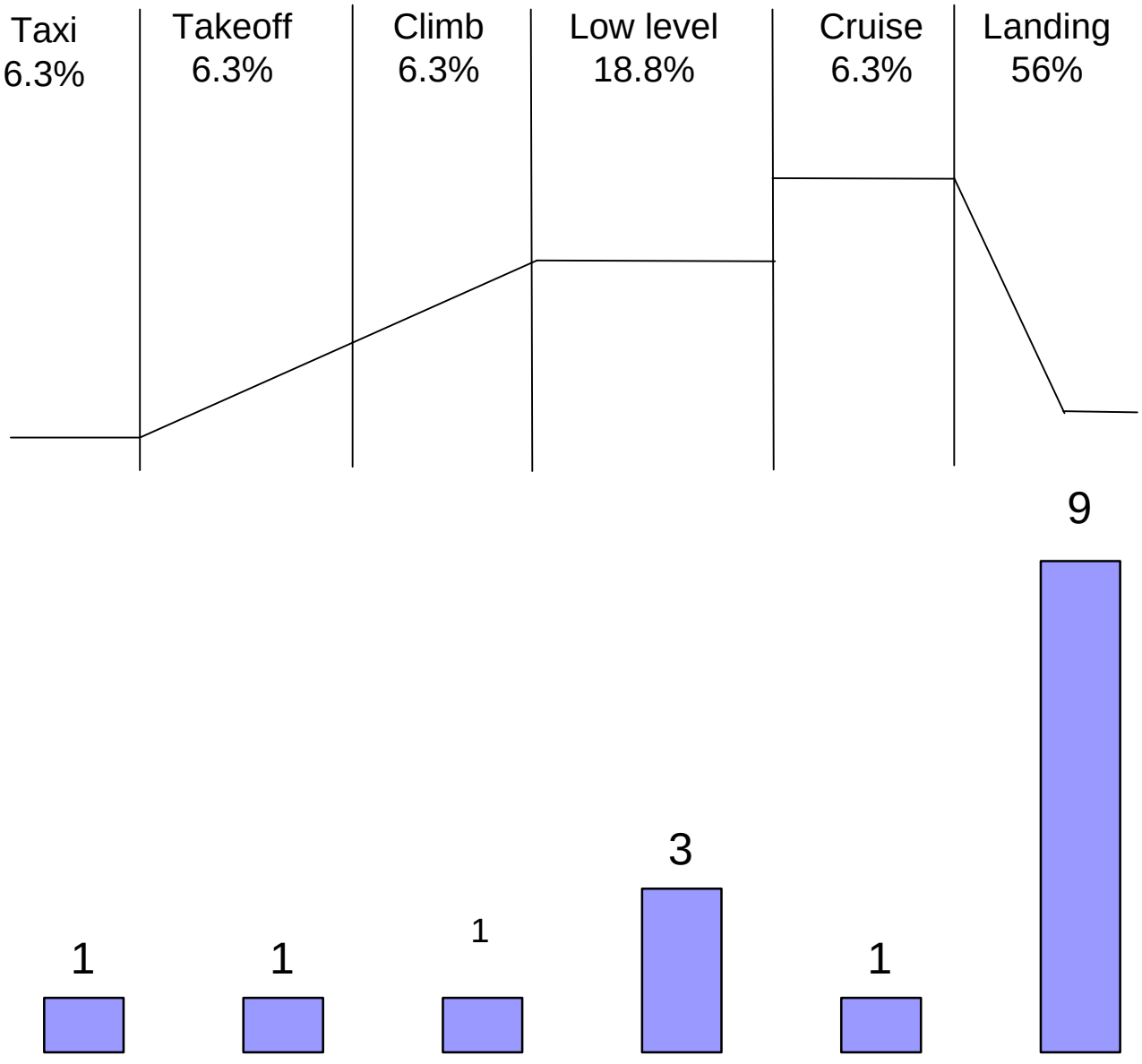






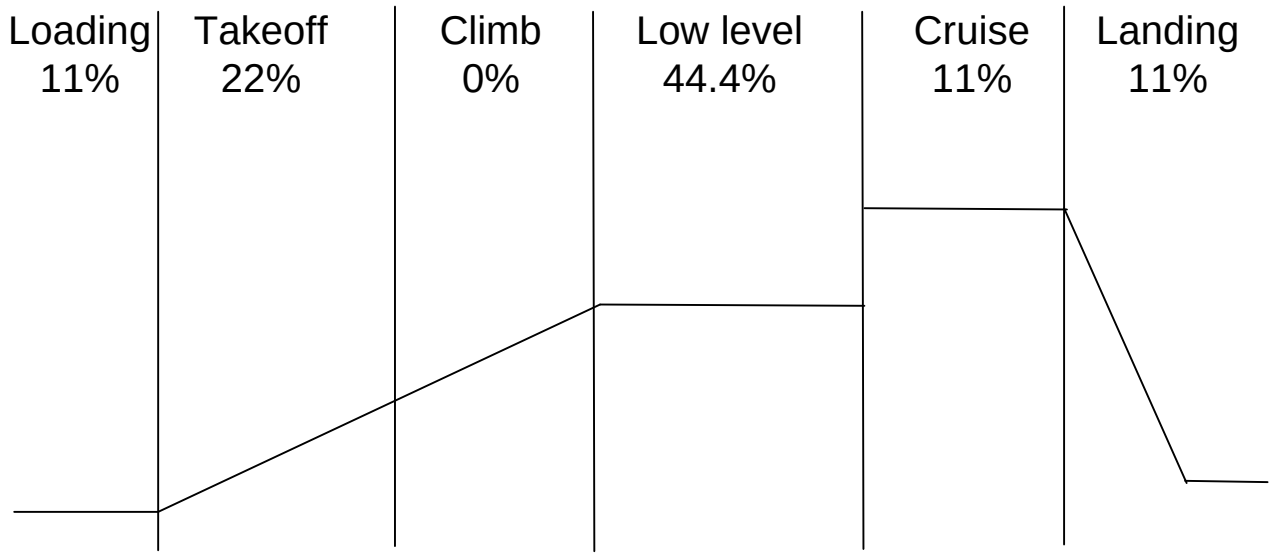
Airplane = 6.57
Helicopter = 4.99

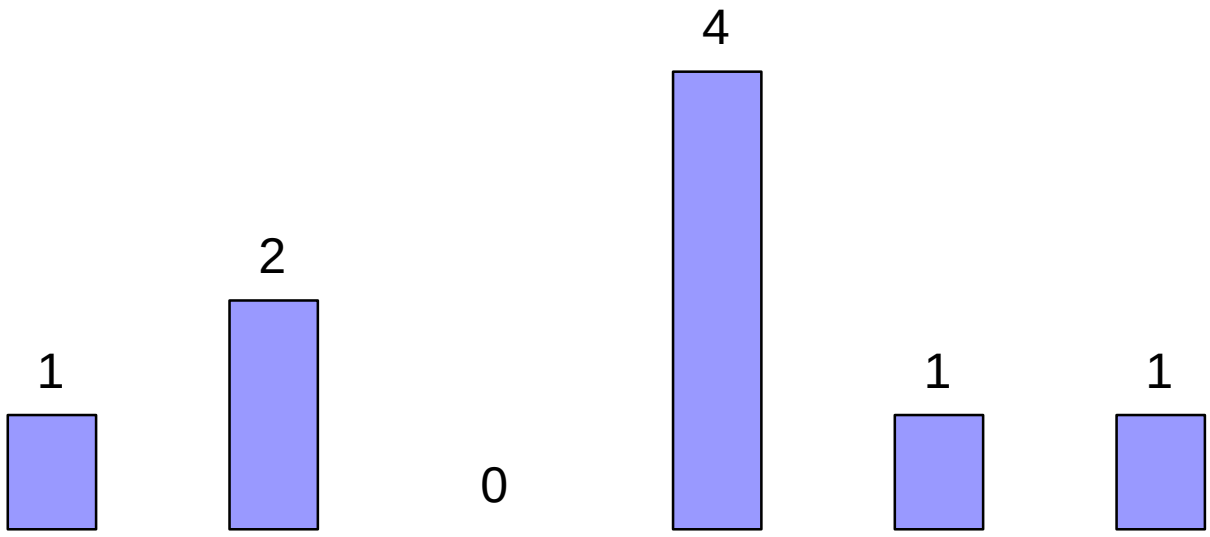
Airplane Phase of Flight Comparisons FY 99 - FY 03



Number of airplane accidents per phase of flight

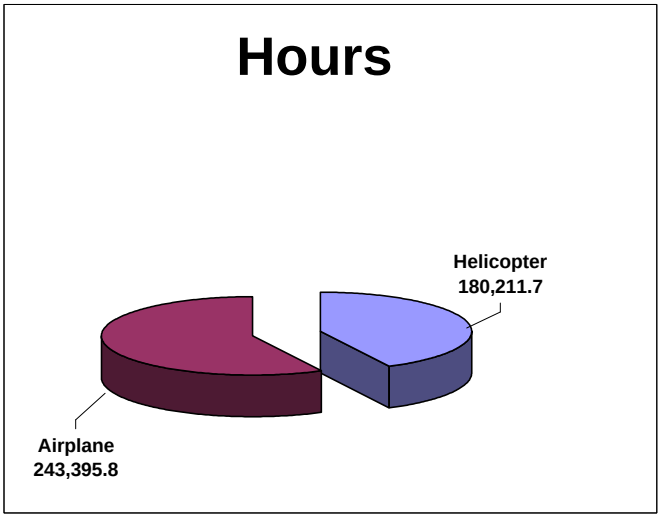
Helicopter Phase of Flight Comparisons FY 99 - FY 03

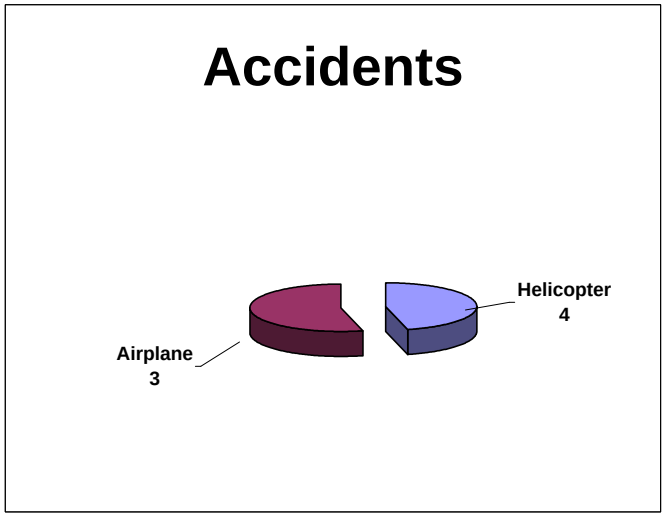


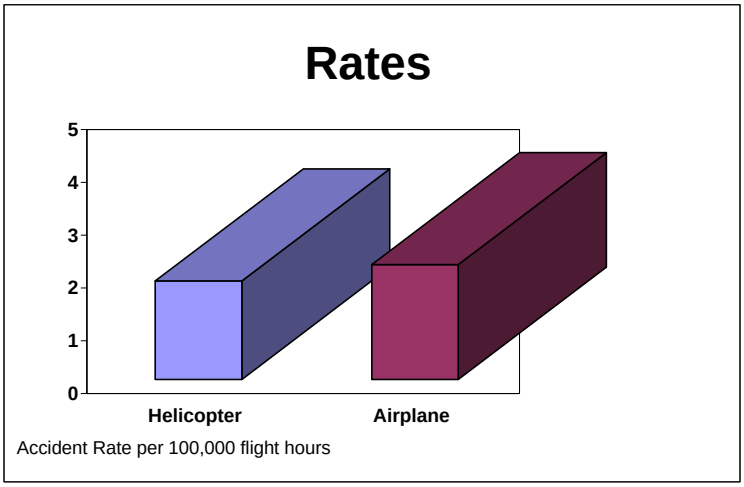


Number of helicopter accidents per phase of flight

FATAL ACCIDENT COMPARISONS
FY 99 - FY 03







Airplane = 1.2
Helicopter = 2.2

Section IV

Aviation Safety Communique (SAFECOM)

The Aviation Safety Communique (SAFECOM) database fulfills the Aviation Mishap Information System (AMIS) requirements for aviation mishap reporting for the Department of the Interior agencies and the U.S. Forest Service (USFS). Categories of reports include incidents, hazards, maintenance, and airspace. The system uses the SAFECOM form OAS-34 or FS-5700-14 to report any condition, observation, act, maintenance problem, or circumstance with personnel or aircraft that has the potential to cause an aviation-related mishap. The SAFECOM system is not intended for initiating punitive actions. Submitting a SAFECOM is not a substitute for "on-the-spot" correction(s) to a safety concern. It is a tool used to identify, document, track and correct safety- related issues. A SAFECOM does not replace the requirement for initiating an accident or incident report.

A commonly held perception is that the SAFECOM system is to be used only by government employees. However, we encourage the use of the system by anyone engaged in DOI/USFS aviation activities that either observes or identifies a hazard.

SAFECOMS may be submitted in any manner that suits the sender, via the web at www.safecom.gov, by phone (1-888-4MISHAP), by fax (DOI, 1-208-433-5007; USFS-1-208-387-5735), or by mail.

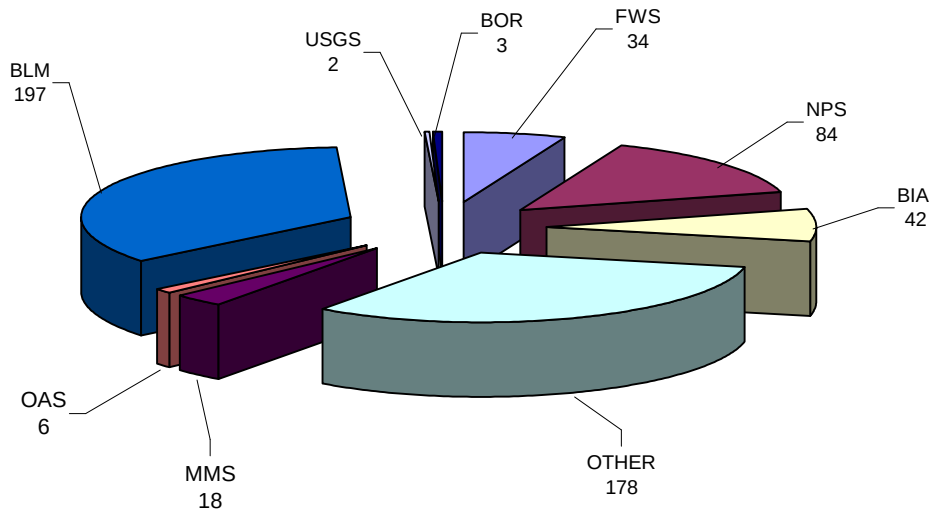
After the completion and submission of a SAFECOM, the data is now currently stored in a central database that is shared on an interagency basis.

For assistance, please call Aviation Management Directorate (AMD), Aviation Safety and Evaluation Division at 208-433-5070 or USFS at 208-387-5285.

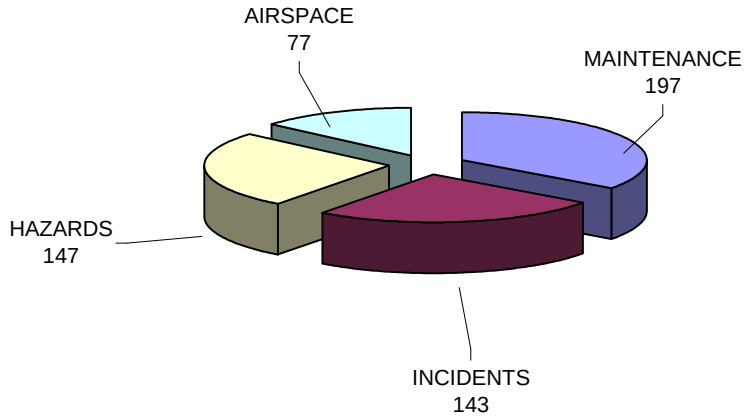
The AMD Aviation Safety and Evaluation Division received a total of 564 SAFECOM reports in FY 03 The subtotals of the FY 03 reports were: 143 aircraft incidents, 77 airspace conflicts, 147 aviation hazards, and 197 aircraft maintenance deficiencies.

SAFECOM SUMMARY
FY 03

BUREAU

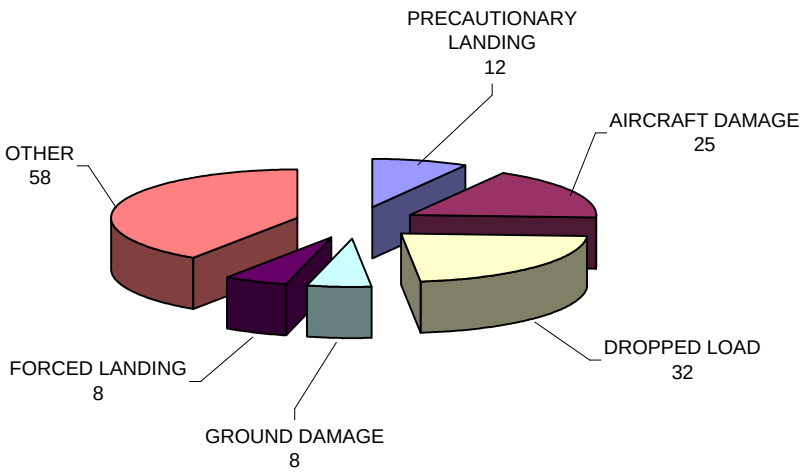


CATEGORY

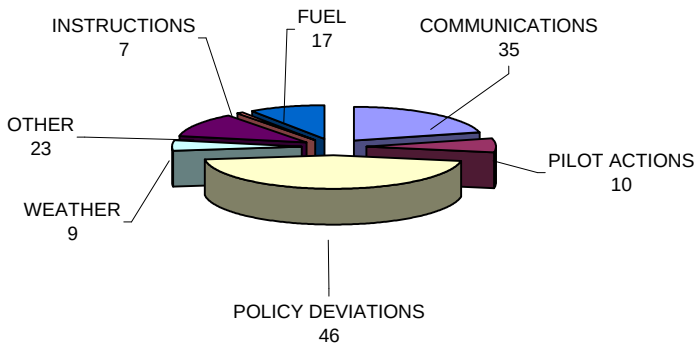


SAFECOM SUMMARY
FY 03

INCIDENT

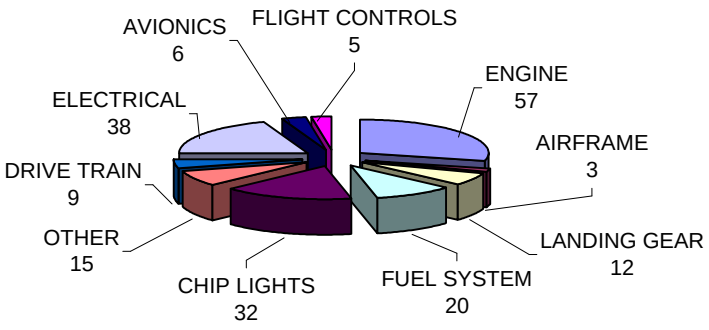


HAZARD

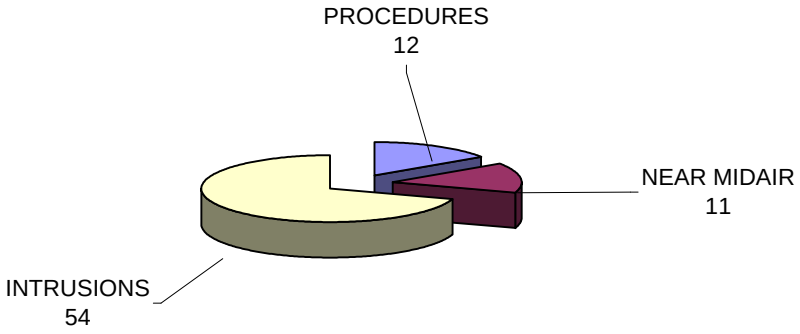


SAFECOM SUMMARY
FY 03

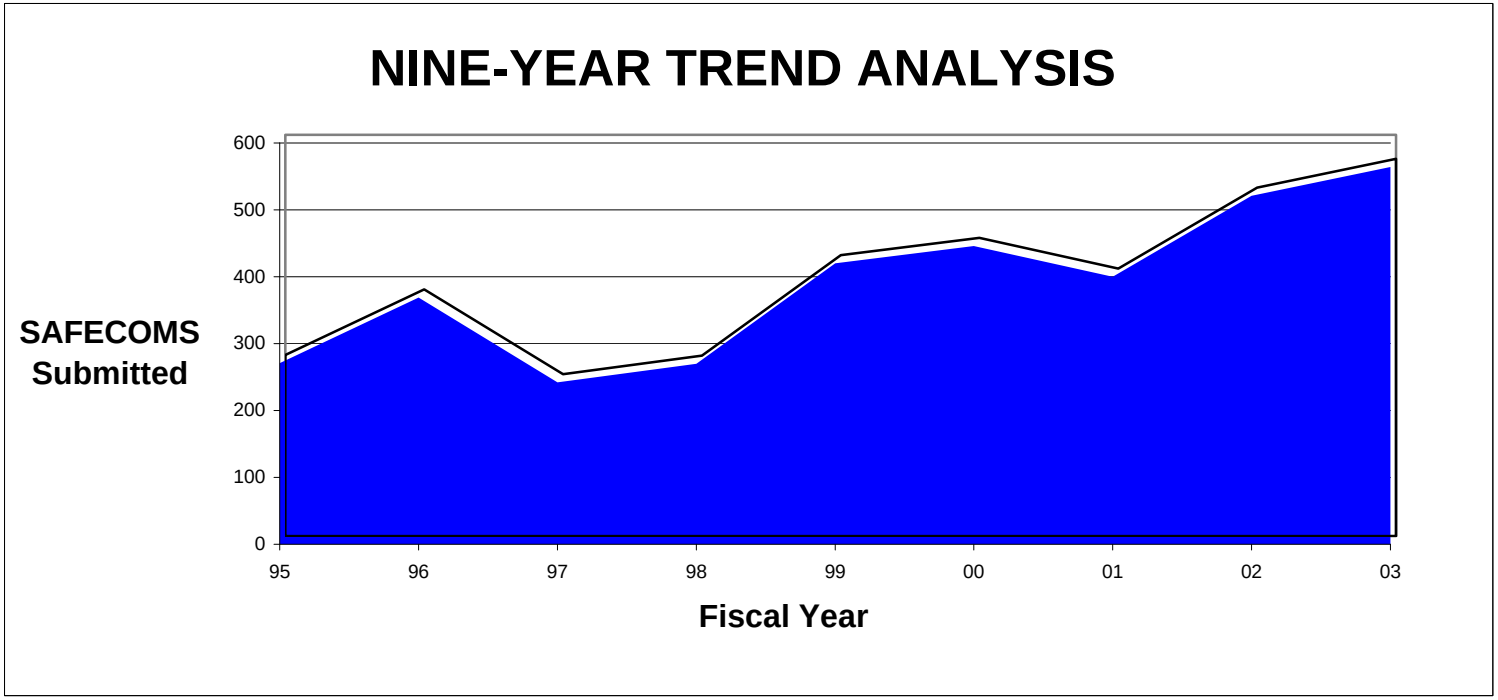
MAINTENANCE



AIRSPACE



95	271
96	369
97	242
98	270
99	420
00	446
01	400
02	521
03	564



Graph 17

GLOSSARY

Aircraft accident. An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.

Aircraft incident. An occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations.

Airspace conflict. A near midair collision, intrusion, or violation of airspace rules.

Aviation hazard. Any condition, act, or set of circumstances that exposes an individual to unnecessary risk or harm during aviation operations.

Fatal injury. Any injury which results in death within 30 days of the accident.

Forced landing. A landing necessitated by failure of engines, systems, or components which makes continued flight impossible, and which may or may not result in damage.

Incident with potential. An incident that narrowly misses being an accident and in which the circumstances indicate significant potential for substantial damage or serious injury. Final classification will be determined by the Aviation Management Directorate, Aviation Safety Manager.

Maintenance deficiency. An equipment defect or failure which affects or could affect the safety of operations, or that causes an interruption to the services being performed.

Non-chargeable accidents. Accidents in which DOI was not exercising operational control over the aircraft at the time of the accident but in which DOI employees or DOI-procured aircraft were involved.

Operator. Any person who causes or authorizes the operation of an aircraft, such as the owner, leasee, or bailee of an aircraft.

Precautionary landing. A landing necessitated by apparent impending failure of engines, systems, or components which makes continued flight unadvisable.

Serious injury. Any injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second-or third-degree burns, or any burns affecting more than 5 percent of the body surface.

Glossary

Substantial damage. Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for the purpose of 49 CFR Part 830.