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16. Abstract

This report contains a discussion of the 105 accidents involving aerobatics which occurred in various small, fixed wing, U. S. general aviation airplanes during the period 1972 through 1974. Detailed statistical information is given regarding the number of injuries, kind of flying, type of accident, accident causes, and pilot experience. The study evaluates the adequacy and applicability of airworthiness standards relating to aerobatic certification, the fundamental importance of proper aerobatic training and orientation, and regulatory controls applicable to airshows. The several most significant types of accidents associated with aerobatics--stalls and spins; collisions with ground/water, wires/poles, trees; and airframe failure in flight--are reviewed in detail. The study concludes with a number of recommendations to the Federal Aviation Administration intended to reduce accidents involving aerobatics.

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TABLE OF CONTENTS

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20594
SPECIAL STUDY

Adopted July 20, 1976

GENERAL AVIATION ACCIDENTS INVOLVING AEROBATICS, 1972-1974

INTRODUCTION

The National Transportation Safety Board was prompted to study aerobatic accidents because of the continued occurrence in recent years of significant numbers of fatal or serious accidents involving aerobatics. For example, from 1972 through 1974, 105 such accidents resulted in 107 fatalities and 21 serious injuries. The Safety Board believes that in view of the growing interest in sport aerobatics and the continuing manufacture of airplanes certificated for aerobatic operation, an effort should be made to reduce the number of aerobatic accidents. This study isolates those problems which require remedial action.

The term aerobatics, as defined in 14 CFR 91.71, is "an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight." Aerobatics include snap rolls, chandelles, loops, aileron rolls, lazy eights, and numerous other precision maneuvers, all of which can be performed safely within specified design limits in airplanes certificated for these operations. The primary risk associated with aerobatics is largely a function of pilot competence, proficiency, and judgment. Therefore, pilots must understand and adhere to the aerobatic limitations of their airplanes, operate within the limits of their abilities and experience, and exercise good judgment in all operational matters relating to the performance of aerobatic maneuvers.

During the barnstorming era of the 1920's and 1930's, aerobatics, stunt flying, and other aerial displays effectively conjured up in the public's mind thoughts of inextricable danger. This interpretation of the sport may have resulted because of operational or airworthiness limitations of the aircraft of that era, and because of the sensationalism associated with air circuses and airshows of that day. While the events and circumstances of those days may have provided some justification for this viewpoint, such a viewpoint is not justified in today's environment.

The maneuvers or circumstances surrounding most of the 105 accidents evaluated in this report were not related to the performance of professional or precision aerobatics because they lacked approved or prescribed operational objectives, related expertise, organization, and planning. In many accidents, the fundamentals of aerobatics--steep turns and pull-ups--are involved only incidentally, while other accidents involved nondescript combinations of aerobatic maneuvers. While these operations may be technically defined as aerobatics, based on the broader definition given above, they are more appropriately referred to as stunt flying, skylarking, or careless and reckless operation.

The aerobatic training manual published by the Cessna Aircraft Company explains that "stunt flying is a situation where the airplane is doing radical maneuvering and nobody (particularly the pilot) knows what is going on or what will be happening next. Precision aerobatic pilots practice hour after hour and know what is going to happen three and seven-tenths maneuvers from now." The high percentage of pilots involved in the cause of aerobatic accidents and the nature of their involvement (attempted operation beyond experience/ability level; failed to follow approved procedures, directives; exercised poor judgment) further substantiate this point. Moreover, professional or competitive aerobatics are conducted only in airplanes designed and approved for aerobatic flight while a number of accidents in this study involved airplanes in which aerobatic operation was prohibited.

AEROBATIC ACCIDENT STATISTICS

The Safety Board's records reveal that there were 105 aerobatic accidents from 1972 through 1974. Seventy-eight aerobatic accidents (74 percent) were fatal and represented 3.76 percent of the 2,071 fatal accidents. One hundred and seven persons lost their lives in aerobatic accidents; 21 persons were injured seriously and 10 persons were injured slightly.

Seventy-eight aerobatic accidents occurred in "noncommercial" kinds-of-flying--58 in pleasure flying, 16 in practice flying, and 4 in other noncommercial flying. Fourteen aerobatic accidents occurred in the "miscellaneous" kind-of-flying category, 9 of which involved airshows. Eight aerobatic accidents occurred during "instructional" flying--five in instructional dual flying and three during instructional solo flight. The remaining five aerobatic accidents occurred in "commercial" flying--four during aerial application or crop control-related flights and one during power or pipeline patrol.

The 105 accidents include the following specific first accident types: Twenty-seven controlled collisions with ground or water; 6 uncontrolled collisions with ground or water; 9 collisions with wires, poles, or trees; 13 stalls; 36 spins; and 10 airframe failures in flight.

The two most significant broad cause/factor categories for aerobatic accidents are "pilot" and "terrain." The pilot was cited as a cause in 97 accidents and as a causal factor in 15 accidents. (More than one cause or factor may be cited in a single accident.) Terrain was a cause of two accidents and a factor in nine accidents. (See Tables 1, 2, 3, and 4.)

Stalls and Spins

Forty-nine of the 105 accidents involved a stall or a spin (36 spins and 13 stalls). Most of these were unintentional and were related to the performance of other aerobatic maneuvers at low altitudes--altitudes which made recovery from the accidental stall or spin either difficult or impossible. Flights at these altitudes were in violation of 14 CFR 91.9, "Careless or Reckless Operation," and 14 CFR 91.71(d), "Aerobatic Flight" (except for those flights associated with airshows where the FAA had issued a waiver or letter of competence). The latter prohibits aerobatics below 1,500 feet above the surface. Accident-prevention efforts, therefore, should be focused primarily on enforcement--an intensive and rigorous campaign by the FAA in which the certificate of any person found guilty of violating these provisions would be suspended or revoked. The conspicuous posting of notices to this effect at general aviation airports throughout the country might be effective. In addition, a regulation to restrict the performance of aerobatic maneuvers to persons holding an appropriate endorsement and the distribution of educational materials should also be considered as a solution to this problem.

On the other hand, some of the spins were intentional and were initiated at altitudes which would normally have been sufficient to permit recovery. Recovery in these cases, however, was not effected either because of inadequate spin recovery techniques at normal recovery altitudes, or because the spin was otherwise prolonged to the point that insufficient altitude remained in which to recover. In some cases, the airplane hit the ground before the spin rotation stopped; in other cases, the airplane crashed after spin rotation had stopped, but before a pullup from the ensuing dive could be completed. Persons involved in these types of accidents had some previous spin instruction, but their overall knowledge and proficiency in spins is believed to have been minimal. For example, they probably were not fully aware of all of the adverse spin characteristics that could be induced through improper use

TABLE 1

DETAILED CAUSAL DATA
("PILOT" and "TERRAIN" CATEGORIES, "MISCELLANEOUS ACTS, CONDITIONS")
AEROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

	FATAL AND NONFATAL ACCIDENTS		
	CAUSE	FACTOR	TOTAL
PILOT			
PILOT-IN-COMMAND			
Attempted operation w/known deficiencies in equipment	1		1
Attempted operation beyond experience/ability level	14	1	15
Exceeded design stress limits of aircraft	3		3
Failed to see and avoid objects or obstructions	2		2
Failed to obtain/maintain flying speed	33		33
Misjudged speed, altitude, or clearance	2		2
Failed to follow approved procedures, directives, etc.	13	4	17
Improper operation of flight controls	29		29
Inadequate preflight preparation and/or planning	3		3
Lack of familiarity with aircraft		2	2
Mismanagement of fuel	1		1
Exercised poor judgment	29	2	31
Operated carelessly	2		2
Misjudged speed and altitude	3	1	4
Misjudged altitude and clearance	10		10
Misjudged altitude	28		28
Misjudged clearance	1		1
Incapacitation	1		1
Physical impairment	3	6	9
Subtotal	178	16	194

TABLE 1 CONT.

TERRAIN	CAUSE	FACTOR	TOTAL
Wet, soft ground	1		1
Snow-covered		1	1
High Obstructions		8	8
Other	1		1
Subtotal	2	9	11

"Miscellaneous acts and conditions" are often given to supplement other causal information such as the above. These were recorded as follows:

MISCELLANEOUS ACTS, CONDITIONS	CAUSE	FACTOR	TOTAL
Disregard of good operating practice	1	1	2
Seatbelt not fastened		2	2
Unwarranted low flying	33	16	49
Correcting lenses-not used		1	1
Fatigue fracture	1		1
Separation in flight		3	3
Corroded/corrosion		1	1
Fuel exhaustion	1		1
Alcoholic impairment of efficiency and judgment	3	5	8
Improperly loaded aircraft-weight-and/or CG		3	3
Interference with flight controls	1		1
Aircraft came to rest in water		10	10
Overload failure	1	2	3
Material failure	2		2
Disconnected	1		1
Flutter		1	1
Jammed	1		1

TABLE 2

PILOT AGE BY PILOT CERTIFICATE
AEROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

	PILOT CERTIFICATE							
AGE	STUDENT	PRIVATE	COMMERCIAL	AIRLINE TRANSPORT	COMMERCIAL WITH FLIGHT INSTRUCTOR CERTIFICATE	AIRLINE TRANSPORT WITH FLIGHT INSTRUCTOR CERTIFICATE	NONE (UNCERTIFICATED OR EXPIRED)	TOTAL
20-24	1	6	3		3			13
25-29	1	7	4		8		1	21
30-34		5	5	1	6			17
35-39	3	1	9					13
40-44		3	4	1	2	1	1	12
45-49		3	5	3	2			13
50-54		3	3		1			7
55-59		2	2		1			5
60 or more		1	2		1			4
	5	31	37	5	24	1	2	105

TABLE 3

PILOT TOTAL TIME BY PILOT CERTIFICATE
AEROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

PILOT CERTIFICATE

TOTAL TIME	STUDENT	PRIVATE	COMMERCIAL	AIRLINE TRANSPORT	COMMERCIAL WITH FLIGHT INSTRUCTOR CERTIFICATE	AIRLINE TRANSPORT WITH FLIGHT INSTRUCTOR CERTIFICATE	NONE (UNCERTIFICATED OR EXPIRED)	TOTAL
LESS THAN 100	4	4						8
100- 299	1	7	2					10
300- 599		10	4		2			16
600- 899		2	3		3			8
900-1199		2	2		1			5
1200-1499			1		2			3
1500-1799		1			1			2
1800-2099		2	2		1			5
2100-2399		1	1		2			4
2400-2699		1	2		2			5
2700-2999			1		1			2
3000 or More			16	5	8	1		30
Unknown/ Not Reported		1	3		1		2	7
	5	31	37	5	24	1	2	105

TABLE 4

PILOT TIME IN TYPE BY PILOT CERTIFICATE
AEROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

PILOT CERTIFICATE

TIME IN TYPE	STUDENT	PRIVATE	COMMERCIAL	AIRLINE TRANSPORT	COMMERCIAL WITH FLIGHT INSTRUCTOR CERTIFICATE	AIRLINE TRANSPORT WITH FLIGHT INSTRUCTOR CERTIFICATE	NONE (UNCERTIFICATED OR EXPIRED)	TOTAL
LESS THAN 100 hr	4	19	10	3	6			42
100- 299	1	4	9		8	1		23
300- 599		1	5		2			8
600- 899				1	1			2
900-1199								
1200-1499					2			2
1500-1799								
1800-2099								
2100-2399		1			1			2
2400-2699			1					1
2700-2999								
3000 or More			1					1
Unknown/ Not Reported		6	11	1	4		2	24
	5	31	37	5	24	1	2	105

of the flight or power controls, or both, or of the essential need to use a precise technique appropriate to their particular airplane in order to optimize the recovery.

The fatal spin accident, which involved a commercial flight instructor and a passenger in a Cessna Model 150J on November 24, 1974, near Morganton, North Carolina, typifies the above circumstances. A witness estimated that the spin continued for at least five turns. Apparently, the airplane had stopped rotating, but struck the ground in a near vertical attitude (File No. 3-3837).

A number of accidents which include the above circumstances involved spins which were apparently initiated at altitudes that allowed little margin for error, such as inept application of recovery controls or a delayed recovery because a pilot misjudged his altitude or became disoriented. This situation is particularly hazardous in the case of the novice or relatively inexperienced pilot. The fatal spin accident on January 28, 1974, just offshore, near Melbourne, Florida, for example, involved a private pilot with less than 100 flight-hours who had been given several hours of aerobatic instruction (File No. 3-0118). He was flying a Cessna Model A150L. A witness who saw the airplane in a spin said the spin continued to a relatively low altitude. The pilot was observed to bail out and his parachute deployed satisfactorily; however, he drowned in rough seas.

Another case involving two commercial pilots further illustrates the potential hazards of initiating spins at relatively low altitudes (File No. 3-3937). The probable cause of this fatal spin accident is cited as "pilot-in-command - misjudged altitude." An excerpt from the factual report describes the circumstances:

> At approximately 1600 c.s.t., a pilot and his companion were observed to board N8344M and depart the airport. Before departure the pilot had made the comment to persons at the airport that he intended to demonstrate spins to his companion.
>
> At approximately 1630 c.s.t., a witness, who was also a commercial pilot, saw an aircraft in flight from a point about one mile northeast of the crash site. The witness saw the aircraft do a series of wing-over maneuvers. After completing one of these maneuvers, the aircraft made a climb and went into a spin, rotating to the left. The aircraft was seen as it continued in a spin until it disappeared from the witness' view behind some trees. This witness estimated the aircraft's altitude to be approximately 3,500 feet when it began to spin.

A second witness, who was watching the aircraft in flight stated that the aircraft turned or spun seven times before it crashed in an open field. Both occupants of the aircraft were found in the cockpit with their seatbelts fastened and wearing back-type parachutes.

Investigation disclosed no evidence of an in-flight malfunction or failure. All aircraft control surfaces and extremities were found within the immediate wreckage area.

The weather in the area was described as clear of clouds with good visibility.

Both occupants held commercial pilot certificates. The pilot was enrolled in a 10-hour acrobatic course and at the time of the accident had received 7.2 hours of dual instruction including spins and spin recovery.

In one accident which resulted during an intentional spin, the airplane's spin characteristics or lack of response may have been a factor in thwarting the pilot's recovery efforts. On September 24, 1972, at Larkspur, Colorado, a Beechcraft Model C-23 airplane failed to recover from a spin despite repeated recovery efforts by a commercial flight instructor and his student. Both parachuted from the airplane. Airworthiness Directive 74-14-05 was issued subsequently to "prevent in-flight situations in which prompt spin recovery may not be assured." The AD applied to Beechcraft Models B-19 and C-23 which were originally approved in the acrobatic category and to intentional spins in the utility and acrobatic categories. The AD prohibited intentional spins in these airplanes and required that all placards pertaining to intentional spins and acrobatic flight be removed. In place thereof, a placard was required which prohibited intentional spins and acrobatic maneuvers except chandelles, lazy eights, steep turns, and stalls (except whip stalls). A Beech spin-improvement kit must be installed for these operating restrictions to be removed.

Several flight instructors have complained of difficulty in recovering from spins in Cessna Model 150 airplanes. Detailed investigation by the FAA, however, disclosed that the problems were related to operational vagaries or anomalies, inadequate knowledge regarding the precise spin recovery procedures necessary for the airplane, improper application or misapplication of recovery controls, apprehension, and confusion. As a result of these incidents and past spin accidents, the initiation of spins at higher, conservative altitudes is being emphasized. For example, the 1976 pilot's operating handbook for the Cessna 150 Aerobat recommends that :

"Where feasible, entries be accomplished at high enough altitude that recoveries are completed 4,000 feet or more above ground level. At least 1,000 feet of altitude loss should be allowed for a 1-turn spin and recovery, while a 6-turn spin and recovery may require somewhat more than twice that amount. For example, the recommended entry altitude for a 6-turn spin would be 6,000 feet above ground level. In any case, entries should be planned so that recoveries are completed well above the minimum 1,500 feet above ground level required by FAR 91.71. Another reason for using high altitudes for practicing spins is that a greater field of view is provided which will assist in maintaining pilot orientation."

While the frequency of spin accidents involving the operational circumstances described above is not unusually high, these accidents occur regularly and usually are fatal. Furthermore, in view of the expanding aerobatic interest in spins, the frequency of these accidents can be expected to increase unless steps are taken to prevent their recurrence.

Based on the provisions of 14 CFR 91.71(d), on airplane spin mechanics and recovery requirements, and on the human potential for error, the Board believes that a supplemental schedule of minimum initial spin altitudes should be incorporated into 14 CFR 91.71. For example, no spin, regardless of duration or number of turns, should be permitted to begin below 3,500 feet above the surface and spins initiated at this altitude should not exceed a designated number of turns before recovery is begun. A conservative increment in altitude should be required for each additional spin turn or fraction thereof.

In years past, spins and spin-recovery procedures have been oversimplified. Only recently have precise recovery procedures been emphasized for a particular airplane. There are, moreover, various operational circumstances which stem from confusion, apprehension, disorientation, and the misapplication of flight controls which may hamper the recovery process. Because some of the knowledge regarding spins and spin-recovery techniques has been attained only recently, flight instructors may not be aware of many of the operational implications.

To disseminate recent spin information, the FAA's Central Region, in cooperation with the Cessna Aircraft Company, devoted most of its "Flight Instructor Bulletin" of August 1975 to spins, particularly as they relate to the Cessna Models 150, A150, 172, and 177. (See Appendix F.)

The FAA's Central Region also initiated a spin indoctrination program relating to the spinning characteristics of typical general aviation airplanes, particularly those used extensively for training. On August 16 and 17, 1975, the first of a series of stall/spin clinics was held at St. Louis, Missouri. The clinic was held to brief flight instructors on the precise spin characteristics of the Cessna 150 and, through actual flight demonstrations, provide appropriate operational indoctrination. A subsequent clinic dealt with the spin characteristics of Piper Cherokee airplanes.

Collisions With Ground/Water, Wires/Poles, Trees

There were four types of collisions which were associated with 42 (40 percent) of the 105 accidents: Twenty-seven were controlled collisions with the ground or water, six were uncontrolled collisions with the ground or water, two were collisions with wires or poles, and seven were collisions with trees. Again, many of these accidents reflect the hazards of performing aerobatics at low altitudes. While a few of these collisions occurred during an authorized airshow, most involved flights conducted in violation of one or more of the provisions of 14 CFR 91.71. Safety Board records show that some of the more significant causes or causal factors relating to these accidents are as follows:

- Exercised poor judgment.
- Misjudged altitude.
- Unwarranted low flying.
- Attempted operation beyond experience/ability level.
- Failed to follow approved procedures, directives, etc.
- Alcoholic impairment of efficiency and judgment.
- Misjudged altitude and clearance.
- Improper operation of flight controls.

The remedial action necessary to reduce these types of accidents is identical to that previously discussed in connection with stalls and spins--an intensive enforcement compaign by FAA.

Airshow Aerobatics

Before conducting an airshow, the sponsor of the airshow must obtain a certificate of waiver or authorization from the Federal Aviation Administration. The operations authorized and the waived regulations are specified thereon such as aerobatic flights associated with an airshow, waiver of Part 91.71(c) (flight within a control zone or Federal airway), and waiver of Part 91.71(d) (acrobatic flight below an altitude of 1,500 feet above the surface). The certificate is accompanied by a list of special provisions pertinent to the operations

authorized and any participating pilot, if he is to operate below 1,500 feet above the surface, must also possess a current letter of competency indicating that he has demonstrated satisfactorily his ability to perform aerobatics for public airshows. This letter may contain limitations relating to minimum operating altitude, permissible maneuvers, and type of aircraft.

As previously noted, there were nine accidents directly associated with the actual performance of aerobatics at airshows; three of these were fatal, five involved serious injuries, and one involved minor injuries. In addition, 7 of the 16 accidents which occurred in non-commercial practice flying were related indirectly to an airshow since their associated flight purposes involved the practice of maneuvers to be performed at an airshow at some future time. Six of the seven accidents were fatal; one involved serious injuries. (See Table 5.)

The aerobatic maneuvers being performed included rolls or inverted flight at low altitude, snap rolls, and spins at low altitude.

Airframe Failure In Flight

Airframe failure in flight is one of the several primary types of accidents relating to aerobatic mishaps and was evidenced in 10 of the 105 aerobatic accidents. Five airplanes involved were experimental or amateur-built, three were certificated in the aerobatic category, one was certificated in the normal category, and one was uncertificated. (See Table 6.)

The avoidance of such a failure is of special interest to aerobatic pilots since an adequate understanding and respect for an airplane's structural limitations are fundamental prerequisites for the performance of aerobatic maneuvers. To avoid exceeding an airplane's design stress limits, the aerobatic pilot knows he must stay within two structural limitations: One pertaining to airspeed, the other to load factor. Normally, the airspeed indicator is monitored routinely and, as an aid to the pilot in observing airspeed limits, a radial red line has been painted on the instrument to designate Vne--the never-exceed airspeed. The following comments regarding the never exceed airspeed and limit load factor are excerpted from the Citabria Owners Manual:

> "The never-exceed speed is equivalent to the limit load factor--it is the maximum speed expected in service. It is shown by a red line on the airspeed indicator, and, as the name implies, should never be exceeded.
>
> "NOTE: In a Citabria, a slightly nose-low attitude when inverted will allow a rapid buildup of speed. Watch the airspeed indicator when inverted to prevent exceeding the never-exceed speed.

TABLE NO. 5
AIRSHOW AEROBATICS
CAUSE/FACTOR SUMMARY
AEROBATICS-INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972-1974

FILE NO.	AIRCRAFT	CAUSE/FACTOR DATA	REMARKS
3-2127	Bellanca 8KCAB	PILOT-IN-COMMAND - misjudged altitude and clearance, improper operation of flight controls. Weather - downdraft, updrafts. 1/	
3-3306	Bellanca 8KCAB	PILOT-IN-COMMAND - failed to obtain/maintain flying speed, improper operation of flight controls. 2/	Complex low altitude roll maneuver.
3-3099	Bellanca 8KCAB	PILOT-IN-COMMAND - failed to follow approved procedures, directives, etc., misjudged altitude and clearance. 2/	Authorization limited 500 ft. above ground level. After spin rotation stopped aircraft observed half twist before almost vertical descent.
3-2967	CESSNA A150K	PILOT-IN-COMMAND - misjudged altitude, improper operation of flight controls, failed to follow approved procedures, directives, etc.	Letter of competence - minimum altitude 100 ft. above surface. Two successive rolls, left wing hit ground second roll.
3-1913	N. American SNJ-5	PILOT-IN-COMMAND - Misjudged altitude.	

1/ Weather Briefing - No briefing received.

2/ Fire after impact.

TABLE 5 CONT.

3-3673	Piper J-3	PILOT-IN-COMMAND - misjudged altitude.	Pilot entered intentional spin at 500 ft. Did not recover fully before striking ground.
3-3095	WACO UPF-7	PILOT-IN-COMMAND - failed to obtain/maintain flying speed. Terrain - high obstructions.	Aircraft hit trees.
3-2056	Starduster TOO	PILOT-IN-COMMAND - Failed to obtain/maintain flying speed. 2/	Wooded swamp. Pilot lost control at insufficient altitude to recover during authorized low level acrobatics in airshow.
3-3399	Zimmerman S-1C	PILOT-IN-COMMAND - misjudged altitude	Spin demonstration, late recovery. Stopped rotation, hit ground during recovery.

2/ Fire after impact.

TABLE NO. 6
AIRFRAME FAILURE IN FLIGHT
CAUSE/FACTOR SUMMARY
AEROBATICS-INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972-1974

FILE NO.	AIRCRAFT	CAUSE/FACTOR DATA	REMARKS
3-4120	Avion Mudry CAP10B	PILOT-IN-COMMAND - inadequate preflight preparation and/or planning. MISCELLANEOUS - foreign material affecting normal operations. SYSTEMS - flight control systems: elevator and elevator tab control system. MISCELLANEOUS ACTS, CONDITIONS - jammed.	Preflight, cable tension tool inadvertently left on rudder cable jammed elevator bellcrank. Parachuted OK.
3-3704	Bellanca 7GCBC	PILOT-IN-COMMAND - improper operation of flight controls, exceeded designed stress limits of aircraft. MISCELLANEOUS ACTS, CONDITIONS - overload failure.	Entered acrobatic maneuver at too low altitude to effect safe recovery. Right wing failed.
3-1676	Bellanca 8KCAB	PILOT-IN-COMMAND - exceeded designed stress limits of aircraft, - incapacitation.	Pilot stated he blacked out during high g Loads. Both wings deformed. Pilot landed OK.
3-1184	Erco 415-C	PILOT-IN-COMMAND - exercised poor judgment, improper operation of flight controls. MISCELLANEOUS ACTS, CONDITIONS - unwarranted low flying. AIRFRAME - flight control surfaces: aileron surfaces, attachments. MISCELLANEOUS ACTS, CONDITIONS - corroded/corrosion, flutter, separation in flight.	Right aileron counter weight separated in flight during low level aerobatics over pilot's home.

TABLE 6 CONT.

3-2334	Jeanies Teenie	SYSTEMS - flight control systems rudder and rudder tab control system. MISCELLANEOUS ACTS, CONDITIONS - disconnected. PERSONNEL - maintenance, servicing, inspection: inadequate maintenance and inspection. MISCELLANEOUS - unqualified person operated aircraft.	Rod end bearing attach push-pull torque tube to rudder control horn failed. Aircraft and pilot uncertificated.
3-2076	May Flybaby 1	PILOT-IN-COMMAND - exceeded designed stress limits of aircraft, failed to follow approved procedures, directives, etc. AIRFRAME - wings, spars. MISCELLANEOUS ACTS, CONDITIONS - overload failure, separation in flight.	Right wing separated during prohibited loop maneuvers.
3-0152	Pitts S-1S	AIRFRAME - wings, other. MISCELLANEOUS ACTS, CONDITIONS - material failure, separation in flight.1/	Lower right wing disintegrated during low level practice for air show, cause of material failure not determined.
3-1997	BEDE BD-5J	AIRFRAME - fuselage: windshields, windows, canopies. MISCELLANEOUS ACTS, CONDITIONS - material failure.	Steep descent - 230KTS(Vne 250KTS). Canopy failed hitting pilot in head. Aircraft subjected to approximately 15g.
3-1545	Hazard-Turn T-40H	AIRFRAME - wing spars. PERSONNEL - production design personnel, substandard quality control. MISCELLANEOUS ACTS, CONDITIONS - overload failure.	Right wing main spar at right strut attach point weakened by mislocated drilled holes.

1/ Fire after impact.

TABLE 6 CONT.

3-1132	Pitts Spcl S-2A	AIRFRAME - flight control surfaces: horizontal stabilizer, attachments. MISCELLANEOUS ACTS, CONDITIONS - Fatigue fracture. TERRAIN - wet soft ground.2/	Right horizontal stabilizer forward attach tube failed during two point roll. Pilot had to land fast in plowed field.

2/ EMERGENCY CIRCUMSTANCES - Forced landing off airport on land. Suspected or known aircraft damage.

"If you should ever get into a position from which you cannot recover without exceeding either the never-exceed speed or the limit load factor, it is usually best to recover without exceeding the limit load factor, even if airspeed exceeds the never-exceed speed."

Despite the emphasis placed on the critical importance of observing an airplane's limit load factors during the performance of aerobatic maneuvers, accelerometers (instruments which measure load factor) are not required on most aerobatic airplanes. An accelerometer is required in Bellanca's Champion Model 8KCAB (the Decathlon), which has limit load factors of -5g and +6g, but not in predecessor Bellanca models, such as the 7ECA, which have limit load factors of only -2g and +5g.

Accelerometers are useful for indicating not only the immediate load factor, but also for temporarily recording the maximum and minimum load factors induced during a maneuver or series of maneuvers. This capability provides a means of assessing or calibrating the adequacy and precision of certain maneuvers or combinations of maneuvers (e.g., loops and immelmanns).

As pointed out in studies conducted by the National Aeronautics and Space Administration, stick forces are not necessarily a reliable indication of load factor, particularly negative load factor, nor do they pose any significant physical constraint to the generation of excessive load factors. While aerobatic pilots may acquire capability for sensing the approximate load factor, critical dependence on this means alone to assure operation within precise limits does not appear justified.

While installation of an accelerometer does not assure that an airplane will not be overloaded, repeated indications to a pilot that he is inducing load factors which approach or exceed structural limits would prompt him to alter or discontinue his actions, or at least to exercise more caution. While it is important to avoid exceeding limit load factors, it is equally important to know when these load factors have been exceeded.

AIRWORTHINESS STANDARDS

Airplane Categories

The operations or maneuvers which may be performed in airplanes currently certificated in accordance with 14 CFR 23 are given in Part 23.3, "Airplane categories":

(a) The normal category is limited to airplanes intended for nonacrobatic operation. Nonacrobatic operation includes -

(1) Any maneuver incident to normal flying;

(2) Stalls (except whip stalls); and

(3) Lazy eights, chandelles, and steep turns, in which the angle of bank is not more than 60 degrees.

(b) The utility category is limited to airplanes intended for limited acrobatic operation. Airplanes certificated in the utility category may be used in any of the operations covered under paragraph (a) of this section and in limited acrobatic operations. Limited acrobatic operation includes -

(1) Spins (if approved for the particular type of airplane); and

(2) Lazy eights, chandelles, and steep turns, in which the angle of bank is more than 60 degrees.

(c) The acrobatic category is limited to airplanes intended for use without restrictions other than those shown to be necessary as a result of required flight tests.

(d) Small airplanes may be certificated in more than one category if the requirements of each requested category are met.

Limit Maneuvering Load Factors

The related structural limitations associated with the above categories are given in Part 23.337, "Limit maneuvering load factors":

(a) The positive limit maneuvering load factor may not be less than -

(1) $2.1 + \frac{24,000}{W+10,000}$ for normal category airplanes, except that n need not be more than 3.8

(2) 4.4 for utility category airplanes; or

(3) 6.0 for acrobatic category airplanes.

(b) The negative limit maneuvering load factor may not be less than -

(1) 0.4 times the positive load factor for the normal and utility categories; or
(2) 0.5 times the positive load factor for the acrobatic category.

(c) Maneuvering load factors lower than those specified in this section may be used if the airplane has design features that make it impossible to exceed these values in flight.

Spinning

The spin requirements for each category are contained in Part 23.221, "Spinning":

(a) Normal category. A single-engine, normal category airplane must be able to recover from a one-turn spin or a 3-second spin, whichever takes longer, in not more than one additional turn, with the controls used in the manner normally used for recovery. In addition -

(1) For both the flaps-retracted and flaps-extended conditions, the applicable airspeed limit and positive limit maneuvering load factor may not be exceeded;

(2) There may be no excessive back pressure during the spin or recovery; and

(3) It must be impossible to obtain uncontrollable spins with any use of the controls.

For the flaps-extended condition, the flaps may be retracted during recovery.

(b) Utility category. A utility category airplane must meet the requirements of paragraph (a) of this section or the requirements of paragraph (c) of this section.

(c) Acrobatic category. An acrobatic category airplane must meet the following requirements:

(1) The airplane must recover from any point in a spin, in not more than one and one-half additional turns after normal recovery application of the controls. Prior to normal recovery application of the controls, the spin test must proceed for six turns or 3 seconds, whichever takes longer, with flaps retracted, and one turn or 3 seconds, whichever takes longer, with flaps extended. However, beyond 3 seconds, the spin may be discontinued when spiral characteristics appear with flaps retracted.

(2) For both the flaps-retracted and flaps-extended conditions, the applicable airspeed limit and positive limit maneuvering load factor may not be exceeded. For the flaps-extended condition, the flaps may be retracted during recovery, if a placard is installed prohibiting intentional spins with flaps extended.

(3) It must be impossible to obtain uncontrollable spins with any use of the controls.

(d) AIRPLANES "Characteristically incapable of spinning". If it is desired to designate an airplane as "characteristically incapable of spinning" this characteristic must be shown with -

(1) A weight five percent more than the highest weight for which approval is requested;

(2) A center of gravity at least three percent aft of the rearmost position for which approval is requested;

(3) An available elevator up-travel four degrees in excess of that to which the elevator travel is to be limited for approval; and

(4) An available rudder travel seven degrees, in both directions, in excess of that to which the rudder travel is to be limited for approval.

The above airplane categories are defined in essentially the same way in both CFR 23 and Part 3 of the Civil Air Regulations (CAR 3). This latter regulatory part was the basis for certification before CFR 23 became effective. The limit maneuvering load factor and spin requirements in these parts are the same except that the spin requirements in CAR 3 were applicable to all airplanes of 4,000 pounds or less maximum weight while those in Part 23 apply only to single-engine airplanes.

Operational Considerations

Applications for airplane certification received between November 13, 1945, and February 1, 1965, were processed in accordance with the airworthiness standards in CAR 3; those received before November 13, 1945, were governed by Part 4a or Part 04 of the Civil Air Regulations, or Aeronautics Bulletin No. 7-a. A substantial number of older airplanes operating today such as the Aeronca Champion, Cessna 120/140, Luscombe, Piper J-3, and Taylorcraft, were certificated under CAR 4a or CAR 04.

An applicant who certificated an airplane in accordance with CAR 04 or CAR 4a could elect to do so in the normal, acrobatic,or transport categories depending on the intended use of the airplane. The airworthiness standards for the normal and acrobatic categories under these parts, however, including those relating to maneuvering load factors, were the same. Additionally, the operational category of some airplanes certificated under these parts is not specified on the type certification data sheets. Neither is there an approved flight manual nor approved operating limitations governing their use. Consequently, from a regulatory point of view, these airplanes may engage in aerobatics with no restrictions as to type of maneuvers which may be performed.

The regulatory requirements for certification in the acrobatic category have been improved and expanded somewhat over the years with respect to structural standards which distinguish between type of airplane operation, demonstration of maneuvers for which certification is requested, specifications regarding approved types of acrobatic maneuvers, and entry speeds. One significant difference in the aerobatic criteria between Part 23 and CAR Parts 04 and 4a is in regard to the limit maneuvering load factor. As noted above, Part 23 requires that the limit maneuvering load factor envelope extend from -3g to +6g. In contrast, the Citabria, a present-day aerobatic airplane certificated in accordance with Part 4a (because it was derived from the normal category, Aeronca Champion originally certificated under this Part), has an operational envelope that extends from -2g to +5.2g. The manufacturer of the Citabria also builds the aerobatic Decathlon, an airplane which was certificated under Part 23 in the early 1970's. This airplane has an operational limit load factor envelope extending from -5g to +6g and is capable of performing many of the more complex inverted competitive type aerobatics.

The National Aeronautics and Space Administration has studied the actual flight loads on a number of general aviation airplanes for comparison with their design flight envelopes, including accelerations measured during individual practice, and competitive aerobatics. As a result, one of the conclusions contained in a 1968 NASA report entitled "Initial Report on the Operational Experiences of General Aviation Aircraft" pointed out that "A limited sample of data from aerobatic operations shows significant exceedances of the minimum negative limit load factor required by FAR 23 for certification in the aerobatic category when obligatory groups of maneuvers are performed." A joint program was subsequently undertaken between NASA and the Champion Aircraft Corp. to investigate aerobatic loading conditions in more detail. Data were taken on a test airplane which participated in national aerobatic competition. This program resulted in the 1970 NASA report entitled "Loading Conditions Measured During Aerobatic Maneuvers" and substantiated the aerobatic findings in the previous report.

The following excerpt from this report points out the potential for exceeding the limit maneuvering load factors:

> "For the maneuvers in which the negative normal load factor exceeded a value of -3, the maximum stick push forces ranged 15-44 lb, depending primarily on the elevator trim tab position. The pilot control force, therefore, would not be a reliable indication of the negative normal load factor, nor would the control force be a physical limit for load factors that exceeded the minimum required negative load factor.
>
> "The largest positive normal load factors occurred during pullout and pullup portions of various maneuvers as the pilot was trying to turn a square corner. The load factor for two of these maneuvers came very close to the positive limit maneuver envelope. The maximum stick pull force for one maneuver was 55 lb; therefore it would appear that exceeding the positive limit maneuver envelope is not limited by the physical capabilities of the pilot. It seems quite probable that the positive limit maneuver load factor would be exceeded occasionally, particularly during competitive conditions."

The Safety Board realizes that the airworthiness standards in 14 CFR 23 are only minimum standards and that certification in the aerobatic category does not necessarily mean that all types of aerobatic maneuvers may be performed. Moreover, if those aerobatic maneuvers approved for a particular airplane were always flown by experienced aerobatic pilots, the potential for exceeding the design flight envelope would be remote. Professional aerobatic pilots, however, tend to fly higher strength, higher performance airplanes with relatively few restrictions while the novice aerobatic pilots routinely fly the more restricted airplanes. Also, the label "certified for aerobatics" often results in a false sense of security since it implicitly conveys an operational or structural capacity which may not exist. This is particularly true in light of the significant differences in structural limitations between various aerobatic airplanes. Additionally, the actual strength of an aerobatic airplane designed to the standards of CAR 4a may not be significantly greater than that of an airplane certificated in the utility category under 14 CFR 23.

In view of the above information, the expanded interest in aerobatics in recent years,and the performance of increasingly sophisticated aerobatic maneuvers by relatively inexperienced pilots, there is an increasing need to assure complete understanding of all of the operational implications associated with the performance of aerobatics and a margin of safety compatible with the potential consequence of operational error in maneuvers flown by these pilots.

AEROBATIC TRAINING

A course on the fundamentals of aerobatics is usually programmed for a minimum of 10 to 12 hours of flight instruction. The course generally is for a particular airplane, such as the Cessna 150 Aerobat, the Bellanca Citabria, or the Bellanca Decathlon. The specific maneuvers taught include most or all of those approved for these airplanes--spins, loops, aileron rolls, Immelmanns, and snap rolls.

Except in an isolated case or two involving an FAA-approved aerobatic course, there are no regulations which relate directly to the aerobatic curriculum or to pilot flight proficiency or experience since there are no certification tests or airman ratings required in connection with the performance of aerobatics. Consequently, although the operator of a pilot school could apply for FAA approval of an aerobatic course under 14 CFR 141, there are generally no economic or operational reasons for him to do so.

The lack of regulation prompts some concern regarding the quality of aerobatic instruction and the unrestricted performance of aerobatic maneuvers by pilots lacking adequate training or experience in such maneuvers. For example, a flight instructor holding only an "airplane" rating cannot instruct in the capacity of an instrument flight instructor even though he holds an instrument rating. He must pass both an additional written and a practical test before doing so. By contrast, although the operating implications and safety aspects of aerobatics are no less critical, there is no similar prerequisite or criterion to assure instructor competence in this area. Even though a flight instructor may have compiled substantial flight experience, it is essential that, as an aerobatic instructor, he be thoroughly familiar with all of the approved flight maneuvers, specialized operational techniques, and performance flight characteristics of each make and model airplane used. Since there are no aerobatic certification tests or related airman ratings, it is not feasible to require aerobatic instructor ratings. The FAA, however, should consider the issuance of a "letter of competence" or its equivalent. A potential aerobatic instructor would then be required to demonstrate, in the airplane make and model he intends to use, all aerobatic maneuvers approved for that make and model. In place of the demonstration, a certificate would be presented to that instructor indicating that he has completed satisfactorily an aerobatic instructor's orientation course given by the manufacturer or its distributors.

All aerobatic maneuvers approved for a particular make and model airplane can be performed safely by pilots who have been adequately trained in these maneuvers--those who have received comprehensive dual instruction from a qualified flight instructor and have practiced such

maneuvers under his supervision. Conversely, these maneuvers, particularly those involving inverted flight, cannot be performed safely without this type of training. Regardless of a pilot's flight experience, the ability to perform aerobatics safely does not stem automatically from such experience and the acquisition of aerobatic proficiency is not necessarily a natural extension of his overall flying abilities. The following excerpts from the respective Cessna and Bellanca aerobatic training manuals emphasize this point:

- "Of course, no aerobatic maneuvers should be attempted without first having received dual instruction from a qualified aerobatic instructor. Just as you didn't read a book entitled How To Fly, jump in an airplane and proceed to teach yourself to get the machine off the ground and back again. You will agree that had you done just that, you would have been in for a surprising experience. In addition, had you achieved such a feat . . . only bad habits and poor techniques would have developed.

- "Never attempt to do aerobatics unless you are qualified as evidenced by a certificated flight instructor. Only then can you be assured the safety of not exceeding design limitations."

Despite these precautionary notes and in the absence of regulations restricting his performance, the novice aerobatic pilot may perform any of the aerobatic maneuvers approved for his airplane, regardless of their complexity or criticality. Moreover, there is no assurance that dual instruction alone or the completion of an aerobatics course will result in the student's attaining an adequate measure of aerobatic proficiency, particularly since there are no established operational or experience prerequisites for such a course of instruction. The only way to assure that the student has attained this proficiency is to have his aerobatic flight instructor endorse his logbook to this effect in those cases where he believes the student's demonstrated performance warrants it. This endorsement could relate to any or all of the aerobatic maneuvers approved for a particular airplane. Pilots should be prohibited from performing any critical aerobatic maneuver without first obtaining such an endorsement. Although they are sometimes considered as aerobatics, from a technical point of view, chandelles, lazy eights, and other coordination exercises and maneuvers normally practiced and developed during the course of training for airman certification tests need not be included within the context of this endorsement.

CONCLUSIONS

o Since there are no certification tests or airman ratings required in connection with the performance of aerobatics, there are no regulations which relate directly to the aerobatic training curriculum or to the flight instructors' or novice pilots' aerobatic flight proficiency or experience.

o The majority of accidents involving aerobatics are unrelated to precision or professional aerobatics. Many such accidents are merely the result of careless and reckless operation by pilots lacking aerobatic knowledge, training, or proficiency.

o Over the years, regulatory requirements for aircraft certification in the aerobatic category have been improved and expanded somewhat with respect to structural criteria based on type of airplane operation, demonstration of maneuvers for which certification is requested, and approved types of aerobatic maneuvers.

o The operational category (normal or aerobatic) of some older airplanes certificated under Parts 4a or 04 of the Civil Air Regulations is not specified on the type certification data sheet. Neither is there an approved flight manual nor approved operating limitations governing their use. Consequently, from a regulatory point of view, these airplanes may engage in aerobatics with no restrictions as to type of maneuvers which may be performed.

o Flight evaluation studies by the National Aeronautics and Space Administration in one particular aerobatic airplane disclosed that the minimum negative limit load factor required by FAR 23 was exceeded significantly when obligatory (competitive) groups of aerobatic maneuvers were performed; stick forces, it was learned, were not necessarily a reliable indication of load factor, nor was exceeding the limit load factor significantly limited by the physical capabilities of the pilot.

o The aerobatic maneuvers being performed during airshow or airshow-related accidents generally included rolls or inverted flight, snap rolls, and spins at low altitude.

o The majority of the stalls and spins involved in aerobatic-related accidents were unintentional and occurred at low altitudes--altitudes which made recovery from the stall or spin difficult or impossible. Those accidents directly associated

with intentional spins (some of which also occurred because of a lack of altitude sufficient for a complete spin recovery) generally related to lack of pilot experience or proficiency, poor judgment, improper or inadequate spin recovery techniques, etc.

o Because of operational vagaries or anomalies, improper or inadequate application of recovery controls, apprehension, confusion, or disorientation, the initiation of spins at higher altitudes is being increasingly emphasized. Moreover, to obtain consistent, optimum spin recovery results may require use of precise spin recovery techniques.

o Aerobatic accidents involving controlled and uncontrolled collisions with the ground or collisions with wires, poles, or trees, like many of the aerobatic-related stall/spin accidents, merely reflect the hazards of performing aerobatics at low altitude. Most such accidents involved flights conducted in violation of one or more of the provisions of FAR 91.71, "Acrobatic Flight," particularly FAR 91.7(d) which prohibits the operation of an aircraft in acrobatic flight below an altitude of 1,500 feet above the surface.

o Five of the ten airplanes involved in the aerobatics-related, in-flight airframe failures accidents reviewed herein were experimental or amateur built; three were certificated in the aerobatic category; one was certificated in the normal category; and one was uncertificated.

o Despite the emphasis placed on the critical importance of observing an airplane's limit load factor and the operational usefulness of recording load factors induced during a maneuver or series of maneuvers, accelerometers (instruments which measure load factor) are not required on some aerobatic airplanes.

RECOMMENDATIONS

As a result of this Special Study, the National Transportation Safety Board has recommended that the Federal Aviation Administration:

> "Expand the presentation of flight instructor stall/spin indoctrination clinics patterned after the one initially held in FAA's Central Region on August 15-17, 1975, to include all FAA Regions and various popular make and model airplanes. (Class II--Priority Followup.) (A-76-105).

"Require a commercial flight instructor to hold a 'letter of competence' or its equivalent before providing aerobatic instruction other than that routinely required during the normal course of training for airman certification tests. (Class III--Longer-Term Followup.) (A-76-106).

"Require that pilots obtain a logbook endorsement from an aerobatic flight instructor before performing aerobatic maneuvers other than those required in connection with airman certification tests. (Class III--Longer-Term Followup.) (A-76-107).

"Issue an Advisory Circular explaining the operational considerations, airworthiness requirements, and safety aspects associated with the performance of aerobatics. (Class II--Priority Followup.) (A-76-108).

"Require that all airplanes subsequently certificated in the aerobatic category, including those previously certificated in another category under a Regulatory Part other than 14 CFR 23, conform with the currently applicable structural criteria in Subpart C of FAR 23, particularly the provisions relating to limit maneuvering load factors. (Class II--Priority Followup.) (A-76-109).

"Evaluate the feasibility of specifying stick force gradient requirements uniquely applicable to aerobatic airplanes in 14 CFR 23.155,'Elevator Control Force in Maneuvers.' (Class III--Longer-Term Followup.) (A-76-110).

"Amend 14 CFR 91.71, 'Aerobatic Flight' to include a schedule of minimum initial spin altitudes. (Class II--Priority Followup.) (A-76-111).

"Conduct an intensive accident prevention compaign to emphasize and enforce effectively the provisions of 14 CFR 91.71,'Aerobatic flight' and 14 CFR 91.9, 'Careless or Reckless Operation.' (Class II--Priority Followup.) (A-76-112).

"Require the installation of accelerometers in all aerobatic airplanes. (Class III--Longer-Term Followup.) (A-76-113).

"Amend 14 CFR 23,337, 'Limit Maneuvering Load Factor,' to increase the minumum required, negative limit maneuvering load factor for aerobatic airplanes from -3.0 to -4.5. (Class III--Longer-Term Followup.) (A-76-114).

"Amend 14 CFR 23.333, 'Flight Envelope' to require that the negative maneuvering load factor specified in 14 CFR 23.337 for the aerobatic category remain constant between III--Longer-Term Followup.) (A-76-115)."

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ WEBSTER B. TODD, JR.
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Member

July 20, 1976

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APPENDIX A

LIST OF ACCIDENTS IVOLVING AEROBATIC IN-FLIGHT PHASE OF OPERATION

APPENDIX A

LIST OF ACCIDENTS INVOLVING
ACROBATICS INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974
SORTED BY AIRCRAFT MAKE AND MODEL

FILE NUMBER	AIRCRAFT REGIST.	DATE	LOCATION	AIRCRAFT MAKE	AIRCRAFT MODEL	INJURY INDEX
3 4120	N80DE	122174	VERBANK,NY	AVION MUDRY	CAP10B	MINOR
3 3704	N36034	100673	MORRIS,ILL	BELLANCA	7GCBC	FATAL
3 2944	N9003L	092273	JACKSONVILLE,ARK	CHAMPION	7KCAB	FATAL
3 2276	N2043A	072973	ROCK SPRINGS,WYO	AERONCA	7BCM	MINOR
3 2262	N82372	072274	STUTTGART,ARK	AERONCA	7AC	FATAL
3 0405	N90918	021074	CANON CITY,COLO	BELLANCA	7KCAB	FATAL
3 3963	N1122	120873	SOUTH HAVEN,MICH	CHAMPION	7GCAA	FATAL
3 1847	N8953	072874	ARCHDALE,NC	BELLANCA	7GCBC	FATAL
3 1033	N2536F	033174	XENIA,OHIO	CHAMPION	7ECA	FATAL
3 0276	N9027L	031773	MADERA,CALIF	CHAMPION	7KCAB	FATAL
3 0204	N85401	013073	SLOUGHHOUSE,CALIF	AERONCA	7AC	SERIOUS
3 3705	N1623G	080772	MCCORDSVILLE,IND	CHAMPION	7ECA	FATAL
3 3618	N9881Y	110572	HONESDALE,PA	CHAMPION	7GCB	FATAL
3 2888	N5136X	070872	SAN RAMON,CALIF	CHAMPION	7KCAB	FATAL
3 1176	N6398N	081272	SHERRILLS FORD,NC	CHAMPION	7GCAA	FATAL
3 1091	N7564F	073072	WINDSOR,VA	CHAMPION	7KCAB	FATAL
3 0284	N5081X	011872	SANGER,TEX	CHAMPION	7GCBC	FATAL
3 2759	N41806	081874	PAPILLION,NEBR	BELLANCA	8KCAB	FATAL
3 1709	N68559	052474	SCOTTSVILLE,VA	BELLANCA	8KCAB	FATAL
3 1676	N41817	052474	NGILROY,CALIF	BELLANCA	8KCAB	NONE
3 3127	N31295	100674	NEW CASTLE,IND	BELLANCA	8KCAB	SERIOUS
3 3306	N36033	111873	SANTA FE,N MEX	BELLANCA	8KCAB	FATAL
3 3099	N86589	090874	S WEYMOUTH,MASS	BELLANCA	8KCAB	FATAL
3 2527	N9473H	091273	NHIDDENITE,NC	FAIRCHILD	M-62C	NONE
3 0908	N54112	060272	MADISON,MISS	FAIRCHILD	M-62A	FATAL
3 3656	N9785L	092472	LARKSPUR,COLO	BEECH	C23	SERIOUS

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1972 - 1974
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FILE NUMBER	AIRCRAFT REGIST.	DATE	LOCATION	AIRCRAFT MAKE	AIRCRAFT MODEL	INJURY INDEX	FI NUM
3 3276	N66489	100774	SOMERVILLE,TENN	BOEING	75	FATAL	3 0
3 3018	N5118N	090174	WAYNESVILLE,NC	BOEING	A75L3	FATAL	3 0
3 1610	N7773V	061474	NHOYT,COLO	CALLAIR	A-9B	SERIOUS	3 1
3 3439	N7238V	062074	STEPHEN,MINN	CALLAIR	A-9	SERIOUS	3 4
3 3818	N2124V	121974	NWASCO,OREG	CESSNA	120	FATAL	3 0
3 0047	N75J	012372	FREEPORT,TEX	CESSNA	140	FATAL	3 1
3 3937	N8344M	110472	WENTZVILLE,MO	CESSNA	A150K	FATAL	3 1
3 0141	N18521	030273	YORK,NY	CESSNA	150	FATAL	3 3
3 1898	N7217S	073173	HAMPTON,IOWA	CESSNA	150H	FATAL	3 0
3 2765	N5904G	100973	MELBOURNE,FLA	CESSNA	150K	FATAL	3 1
3 1881	N19279	061573	KEY WEST,FLA	CESSNA	150L	FATAL	3 1
3 2886	N8441M	051372	METAMORA,MICH	CESSNA	A150	FATAL	3 1
3 2967	N8313M	101473	MCARTHUR,OHIO	CESSNA	A150K	MINOR	3 4
3 0388	N6285G	012672	TOPSAIL,NC	CESSNA	150	NONE	3 2
3 3014	N6047J	092373	HOLLY,MICH	CESSNA	A150L	FATAL	3 1
3 0118	N5930J	012874	NMELBOURNE,FLA	CESSNA	A150L	FATAL	3 3
3 2303	N19266	062974	FAYETTEVILLE,NC	CESSNA	150L	FATAL	3 3
3 0831	N6062J	042374	RIO RANCHO,N MEX	CESSNA	A150L	FATAL	3 2
3 3837	N60581	112474	MORGANTON,NC	CESSNA	150J	FATAL	3 2
3 2708	N11958	091974	PARKIN,ARK	CESSNA	150L	FATAL	3 1
3 0638	N7284T	031474	SILVER CITY,N MEX	CESSNA	172A	FATAL	3 2
3 2795	N9325B	072772	PORT CHARLOTE,FLA	CESSNA	175	SERIOUS	3 0
3 0452	N7869A	032373	LIVERMORE,CALIF	CESSNA	180A	FATAL	3 1
3 2283	N9321T	071274	NTACOMA,WASH	CESSNA	180C	FATAL	3 3
3 0394	N1628T	022074	LEBANON,MO	CESSNA	414	FATAL	3 2
3 1143	N44090	080572	SYLVESTER,GA	CESSNA	A188A	FATAL	3 2

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ACROBATICS INFLIGHT PHASE OF OPERATION
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1972 - 1974
SORTED BY AIRCRAFT MAKE AND MODEL

FILE NUMBER	AIRCRAFT REGIST.	DATE	LOCATION	AIRCRAFT MAKE	AIRCRAFT MODEL	INJURY INDEX
3 0462	N9936G	060372	NSOUTH BEND,IND	CESSNA	188A	FATAL
3 0875	N6346L	042173	ERIE,COLO	AMER AVCO	AA1	FATAL
3 1865	N9507L	060473	FAIRFIELD,CALIF	AMER AVCO	AA1-B	FATAL
3 4023	N9443L	122974	NNEWARK,CALIF	AMER AVCO	AA1-A	FATAL
3 0126	N39860	013073	AURORA,COLO	BELLANCA	17-31A	FATAL
3 1894	N8867V	071573	PINETOPS,NC	BELLANCA	17-30A	FATAL
3 1184	N94031	070472	MCDONALD,PA	ERCO	415-C	FATAL
3 3513	N28741	091672	OGDEN,UT	LUSCOMBE	8C	SERIOUS
3 0665	N626N	040872	CHANDLER,ARIZ	HARVARD	MARKIV	FATAL
3 1719	N3194G	073172	KINGMAN,KANS	N.AMERICAN	SNJ-5	FATAL
3 1672	N7056C	070672	THIEF RVR FL,MINN	N.AMERICAN	SNJ-4	FATAL
3 1913	N1042C	061773	SHELBY,OHIO	N. AMERICAN	SNJ-5	FATAL
3 4197	N4703M	122174	NBRUNSWICK,OHIO	PIPER	PA-11	FATAL
3 2468	N35258	081874	KANKAKEE,ILL	PIPER	J3C-65	FATAL
3 1376	N92304	041674	CORNELIUS,OREG	PIPER	J3C-65	FATAL
3 3673	N1504N	111174	FAIRVIEW,OKLA	PIPER	J-3	SERIOUS
3 3031	N1822P	100474	HUNTINGTON,W VA	PIPER	PA-22	FATAL
3 2152	N8826L	081674	COLFAX,LA	PIPER	PA-25	FATAL
3 2992	N4293T	091074	NJACKSONVILLE,FLA	PIPER	PA-28	FATAL
3 1916	N36240	060472	WARDEN,WASH	TAYLORCRAFT	BC1265	SERIOUS
3 2321	N5016M	070272	LOVINGTON,N MEX	TAYLORCRAFT	BC12-D	FATAL
3 0345	N3262K	012873	DESERT CNTR,CALIF	GLOBE	GC-1B	FATAL
3 1703	N3342K	071374	PLUM ISLAND,MASS	GLOBE	GC-1B	FATAL
3 3095	N29949	081972	VANCOUVER,WASH	WACO	UPF-7	SERIOUS
3 2334	N31JT	082373	HOMER,NY	JEANIES	TEENIE	FATAL
3 2597	N1269	070173	NMONMOUTH,OREG	STORY	MK-7	SERIOUS

APPENDIX A

LIST OF ACCIDENTS INVOLVING
ACROBATICS INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974
SORTED BY AIRCRAFT MAKE AND MODEL

FILE NUMBER	AIRCRAFT REGIST.	DATE	LOCATION	AIRCRAFT MAKE	AIRCRAFT MODEL	INJURY INDEX
3 4170	N7J	122373	LEESBURG,FLA	PITTS	S1C	FATAL
3 4154	N2703B	031372	CARSON CITY,NEV	PITTS	SC-1	FATAL
3 2483	N3192	051773	ATHENS,GA	PITTS	S1C	FATAL
3 1103	N7JG	052774	WESTERLO,NY	GILMORE	3D	NONE
3 2076	N93003	052774	SALEM,OREG	MAY FLYBABY	1	FATAL
3 2979	N701D	101973	COMMERCE,TEX	JUNGMEISTER	BUCKER	MINOR
3 1061	N6733C	041474	NCLEAR LAKE,CALIF	STITS	SA6B	FATAL
3 0924	N50WP	041474	SANTA PAULA,CALIF	STARDUSTER	SA-100	FATAL
3 2056	N3650	052872	ALABASTER,ALA	STARDUSTER	TOO	SERIOUS
3 0487	N591T	061572	CRYSTAL LAKE,ILL	LOWERS	BIRD	FATAL
3 0152	N98X	051072	MERCED,CALIF	PITTS	S-1S	FATAL
3 2630	N7021	090874	HIGHGROVE,CALIF	PITTS SPL	S-1C	FATAL
3 0151	N1151H	051272	WOODLAKE,CALIF	PITTS	S-1S	FATAL
3 0453	N1494	052172	ADELANTO,CALIF	STARDUSTER	TOO	FATAL
3 3399	N5191	081874	WASECA,MINN	ZIMMERMAN	S-1C	SERIOUS
3 3231	N1276	091174	CLAXTON,GA	BREEZY	DP2	NONE
3 0459	N513W	052972	DERRY,PA	PITTS SPCL	S-1	MINOR
3 0446	N14257	051072	PERRIS,CALIF	STARDUSTER	SA-300	FATAL
3 3090	N10BA	100973	FRANKLIN,IND	CORBIN	B-ACE	FATAL
3 2849	N3477	090273	SAN LEON,TEX	ZLIN	Z526	SERIOUS
3 2077	N25C	072074	MT.PLEASANT,TEX	KNIGHT TWST	85B	FATAL
3 1997	N152BD	071774	NEWTON,KANS	BEDE	BD-5J	SERIOUS
3 1545	N13HH	061873	GONZALES,CALIF	HAZARD-TURN	T-40H	FATAL
3 3542	N80022	111773	BOGALUSA,LA	PITTS	S-2A	FATAL
3 4122	N22XP	090973	HOMESTEAD,FLA	PITTS	S-1S	FATAL
3 1132	N8028	080372	MIAMI,FLA	PITTS SPCL	S-2A	NONE

APPENDIX A

LIST OF ACCIDENTS INVOLVING
ACROBATICS INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974
SORTED BY AIRCRAFT MAKE AND MODEL

FILE NUMBER	AIRCRAFT REGIST.	DATE	LOCATION	AIRCRAFT MAKE	AIRCRAFT MODEL	INJURY INDEX
3 3848	N80029	121673	LETOHATCHEE,ALA	PITTS	S-2A	MINOR

APPENDIX B

BRIEFS OF ACCIDENTS

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20594

BRIEFS OF ACCIDENTS

ACROBATIC-INFLIGHT PHASE OF OPERATION

1ST TYPE ACCIDENT-STALL/SPIN

U.S. GENERAL AVIATION

1972 THRU 1974

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0047	1/23/72 TIME - 1300	FREEPORT,TEX	CESSNA 140 N75J DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 27, 297 TOTAL HOURS, 226 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
VICTORIA,TEX
TYPE OF ACCIDENT
STALL

INTENDED DESTINATION
LAFAYETTE,LA

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- LOW PASS ABOUT 20-30 FT ABOVE EDGE OF BEACH. STALLED FROM WG OVER TYPE MANEUVER.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0453	5/21/72 TIME - 0810	ADELANTO,CALIF	STARDUSTER TOO N1494 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 36, 303 TOTAL HOURS, 135 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - EL MIRAGE
DEPARTURE POINT
ADELANTO,CALIF
TYPE OF ACCIDENT
STALL

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- HAMMER-HEAD STALL AFTER BUZZING CAMP SITE ABOUT 20 FT AGL.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0459	5/29/72 TIME - 1615	DERRY,PA	PITTS SPCL S-1 N513W DAMAGE-DESTROYED	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, FL.INSTR., AGE 43, 3334 TOTAL HOURS, 43 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
LATROBE,PA
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- ENTERED INVERTED FLAT SPIN FROM ATTEMPT AT OUTSIDE SNAP ROLL.UNABLE TO RECOVER.PLT BAILED OUT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0665	4/8/72 TIME - 1241	CHANDLER,ARIZ	HARVARD MARKIV N626N DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 40, 600 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - GOODYEAR AUX 6
DEPARTURE POINT
MESA,ARIZ
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- LOST CTL IN LOW ALT ROLL AND SPUN IN.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0908	6/2/72 TIME - 1310	MADISON,MISS	FAIRCHILD M-62A N54112 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL BUSINESS	COMMERCIAL, FL.INSTR., AGE 25, 5746 TOTAL HOURS, 10 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - BRUCE CAMPBELL
DEPARTURE POINT
MADISON,MISS
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FACTOR(S)
PILOT IN COMMAND - LACK OF FAMILIARITY WITH AIRCRAFT
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- PAX WAS FILMING AEROBATIC MANEUVERS,NON REVENUE. PLT FAILED TO RECOVER FROM INTNTL SPIN.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1143	8/5/72 TIME - 0940	SYLVESTER,GA	CESSNA A188A N44090 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	COMMERCIAL ASSOC CROP CTL ACTIVITY	COMMERCIAL, FL.INSTR., AGE 27, 3940 TOTAL HOURS, 200 IN TYPE, NOT INSTRU-

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-1143	8/5/72 TIME - 0940	SYLVESTER,GA	CESSNA A188A N4409Q DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	COMMERCIAL ASSOC CROP CTL ACTIVITY	COMMERCIAL, FL.INSTR., AGE 27, 3940 TOTAL HOURS, 200 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - JACKS STRIP
DEPARTURE POINT
SYLVESTER,GA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT

SPECIAL DATA
TOTAL HOURS IN CROP CONTROL - UNKNOWN/NOT REPORTED
KIND OF CROP - TOBACCO
PILOT'S SEAT BELT - FASTENED-PROPERLY
GOGGLES - NOT USED
COCKPIT CRASHPAD - NOT INSTALLED
TANK/HOPPER-LOCATION - FORWARD OF PILOT
KIND OF OPERATION - SPRAYING CROPS
TYPE OF CHEMICAL USED - LIQUID CHEMICAL-TOXIC
GLOVES - NOT USED
CRASH HELMET - AVAILABLE-USED
CRASH BAR - INSTALLED
REMARKS- PLT FLEW ACROSS STRIP AND DID CHANDELLE TO L. ACFT ENTERED SPIN. CRASHED DURING RECOVERY.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-1719	7/31/72 TIME - 0947	KINGMAN,KANS	N.AMERICAN SNJ-5 N3194G DAMAGE-DESTROYED	CR- 1 PX- 1	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 38, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - KINGMAN
DEPARTURE POINT
KINGMAN,KANS
INTENDED DESTINATION
INDEPENDENCE,MO
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- LOST CTL IN L CHANDELLE SHORTLY AFTER T/O.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1916	6/4/72 TIME - 0745	WARDEN,WASH	TAYLORCRAFT BC1265 N36240 DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 28, 1250 TOTAL HOURS, 800 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - WARDEN
DEPARTURE POINT
WARDEN,WASH
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- ENTERED SPIN AFT HAMMERHEAD STALL AT LOW ALT.

3-2056	5/28/72 TIME - 1450	ALABASTER,ALA	STARDUSTER TOO N3650 DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 60, 10000 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - SHELBY COUNTY
DEPARTURE POINT
ALABASTER,ALA
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FIRE AFTER IMPACT
REMARKS- WOODED SWAMP.PLT LOST CONTROL AT INSUF ALT TO RECOVER DURG AUTHZD LOWLVL ACROBATICS IN AIRSHOW.

3-2795	7/27/72 TIME - 1355	PORT CHARLOTE,FLA	CESSNA 175 N93258 DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 35, 125 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - CHARLOTTE COUNTY
DEPARTURE POINT
PUNTA GORDA,FLA
TYPE OF ACCIDENT
STALL

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2886	5/13/72	METAMORA,MICH	CESSNA A150	CR- 1 0 0	NONCOMMERCIAL	PRIVATE, AGE 27, 113

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2886	5/13/72 TIME - 1609	METAMORA,MICH	CESSNA A150 N8441M DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 27, 113 TOTAL HOURS, 16 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - COUNTRY VIEW
DEPARTURE POINT
PONTIAC,MICH
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
REMARKS- ENTERED SPIN FROM LOW ACROBATIC MANEUVER. ABOUT 42 LBS OVER MAX GROSS WT ON DEP.

3-2888	7/8/72 TIME - 1530	SAN RAMON,CALIF	CHAMPION 7KCAB N5136X DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 30, 974 TOTAL HOURS, 185 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
OAKLAND,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - INTERFERENCE WITH FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - SEAT BELT NOT FASTENED
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
REMARKS- IP SEAT BELT NOT FASTENED. OVER MAX GROSS WT AT T/O ABOUT 150 LBS. AFT CG. LOW LEVEL AEROBATICS.

3-3095	8/19/72 TIME - 1215	VANCOUVER,WASH	WACO UPF-7 N29949 DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 60, 20200 TOTAL HOURS, 450 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - EVERGREEN
DEPARTURE POINT
VANCOUVER,WASH
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
REMARKS- ACFT HIT TREES.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3513	9/16/72 TIME - 1530	OGDEN,UT	LUSCOMBE 8C N28741 DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 21, 275 TOTAL HOURS, 80 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
OGDEN,UT
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - OPERATED CARELESSLY
MISSING AIRCRAFT - LATER RECOVERED
REMARKS- UN RCVR FROM SPIN.RCVRD 9/17/72.

3-3618	11/5/72 TIME - 1115	HONESDALE,PA	CHAMPION 7GCB N9881Y DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 46, 500 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - CHERRY RIDGE
DEPARTURE POINT
HONESDALE,PA
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
REMARKS- ACFT OBSRVD EXECUTING EITHER WNG-OVR OR SNAP-ROLL DRG CLMB OUT.ACFT APRX 110LBS OVR GWT.

3-3656	9/24/72 TIME - 0910	LARKSPUR,COLO	BEECH C23 N9785L DAMAGE-DESTROYED	CR- 0 1 1 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 29, 840 TOTAL HOURS, 22 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
LARKSPUR,COLO
TYPE OF ACCIDENT
STALL SPIN
COLLISION WITH GROUND/WATER UNCONTROLLED

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS
IN FLIGHT UNCONTROLLED DESCENT

PROBABLE CAUSE(S)
MISCELLANEOUS - UNDETERMINED
FIRE AFTER IMPACT
REMARKS- UNABLE TO RECOVER FROM SPIN.PROPER RECOVERY PROCEDURES USED ACCORDING TO INSTR PLT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3937	11/4/72 TIME - 1630	WENTZVILLE,MO	CESSNA A150K N8344M DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 48, 2100 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
INTENDED DESTINATION

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-3937	11/4/72 TIME - 1630	WENTZVILLE,MO	CESSNA A150K N8344M DAMAGE-DESTROYED	CR- 2 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 48, 2100 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.
	DEPARTURE POINT WENTZVILLE,MO		INTENDED DESTINATION LOCAL					
	TYPE OF ACCIDENT STALL SPIN						PHASE OF OPERATION IN FLIGHT ACROBATICS	
	PROBABLE CAUSE(S) PILOT IN COMMAND - MISJUDGED ALTITUDE REMARKS- INTENTIONAL SPIN.							
3-0141	3/2/73 TIME - 1335	YORK,NY	CESSNA 150 N18521 DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 25, 26 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	DEPARTURE POINT LE ROY,NY		INTENDED DESTINATION LOCAL					
	TYPE OF ACCIDENT STALL SPIN						PHASE OF OPERATION IN FLIGHT ACROBATICS	
	PROBABLE CAUSE(S) PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS							
3-0204	1/30/73 TIME - 1130	SLOUGHHOUSE,CALIF	AERONCA 7AC N85401 DAMAGE-SUBSTANTIAL	CR- 0 PX- 0	0 1	1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 24, 230 TOTAL HOURS, 113 IN TYPE, NOT INSTRUMENT RATED.
	DEPARTURE POINT CLARKSBURG,CALIF		INTENDED DESTINATION LOCAL					
	TYPE OF ACCIDENT STALL SPIN						PHASE OF OPERATION IN FLIGHT ACROBATICS	
	PROBABLE CAUSE(S) PILOT IN COMMAND - MISJUDGED ALTITUDE REMARKS- RECOVERY TOO LATE.							
3-0345	1/28/73 TIME - 1105	DESERT CNTR,CALIF	GLOBE GC-1B N3262K DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 55, 837 TOTAL HOURS, 267 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - DESERT CENTER DEPARTURE POINT DESERT CNTR,CALIF		INTENDED DESTINATION LOCAL					
	TYPE OF ACCIDENT STALL						PHASE OF OPERATION IN FLIGHT ACROBATICS	
	PROBABLE CAUSE(S) PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING							

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0875	4/21/73 TIME - 1800	ERIE,COLO	AMER AVCO AA1 N6346L DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 24, 887 TOTAL HOURS, 40 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
BOULDER,COLO
INTENDED DESTINATION
DENVER,COLO
TYPE OF ACCIDENT
STALL SPIN
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS
IN FLIGHT UNCONTROLLED DESCENT

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- ACFT ENTERED A SPIN,THEN WENT INTO A FLAT SPIN.

3-1865	6/4/73 TIME - 1330	FAIRFIELD,CALIF	AMER AVCO AA1-B N9507L DAMAGE-DESTROYED	CR- 1 1 0 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 57, 2244 TOTAL HOURS, 126 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
SAN RAFAEL,CALIF
INTENDED DESTINATION
VACAVILLE,CALIF
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
REMARKS- ACFT PLACARDED-SPINS PROHIBITED.PLT FAILED TO USE ESTABD SPIN RECOVERY TECHNIQUE.

3-1881	6/15/73 TIME - 1313	KEY WEST,FLA	CESSNA 150L N19279 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 39, 20 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
KEY WEST,FLA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- ACFT CONTACTED GRND IN A STEEP NOSE ON ATTITUDE.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1898	7/31/73 TIME - 1458	HAMPTON,IOWA	CESSNA 150H N7217S DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	COMMERCIAL POWER/PIPELINE	COMMERCIAL, FL.INSTR., AGE 25, 2600 TOTAL HOURS, 2100 IN TYPE, INSTRUMENT RATED.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1898	7/31/73 TIME - 1458	HAMPTON,IOWA	CESSNA 150H N7217S DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	COMMERCIAL POWER/PIPELINE	COMMERCIAL, FL.INSTR., AGE 25, 2600 TOTAL HOURS, 2100 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
MASON CITY,IOWA
INTENDED DESTINATION
WATERLOO,IOWA
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- LOST CTL DURING LOW LEVEL AEROBATIC MANEUVER.

3-2483	5/17/73 TIME - 0606	ATHENS,GA	PITTS S1C N3192 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 24, 774 TOTAL HOURS, 14 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - ATHENS MUNICIPAL
DEPARTURE POINT
ATHENS,GA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
REMARKS- 10-15MIN CONT AEROBATICS.DRG VERT SNAP ROLL ENTRD SPIN,2 TURNS 1 DIR REVERSED SPUN IN OTR DIR.

3-2527	9/12/73 TIME - 1715	NR.HIDDENITE,NC	FAIRCHILD M-62C N9473H DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 1	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 25, 310 TOTAL HOURS, 54 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
STATESVILLE,NC
INTENDED DESTINATION
BURNSVILLE,NC
TYPE OF ACCIDENT
STALL MUSH
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
REMARKS- ACFT MUSHED INTO THE GND DURING WINGOVER.DAMAGEDPROP,BECAME AIRBORNE ON CONT FLT LNDD IN TREES.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2765	10/9/73 TIME - 1015	MELBOURNE,FLA	CESSNA 150K N5904G DAMAGE-DESTROYED INTENDED DESTINATION LOCAL	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 25, 86 TOTAL HOURS, 59 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
MELBOURNE,FLA
TYPE OF ACCIDENT
STALL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
PILOT IN COMMAND - MISJUDGED SPEED AND ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- LO LVL ACROBATICS.ACFT CRASHED OFF-SHORE,NOT RCVRD.

3-2849	9/2/73 TIME - 1230	SAN LEON,TEX	ZLIN Z526 N3477 DAMAGE-SUBSTANTIAL INTENDED DESTINATION LOCAL	CR- 0 1 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 46, 1200 TOTAL HOURS, 30 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
LA PORTE,TEX
TYPE OF ACCIDENT
STALL SPIN

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - DISREGARD OF GOOD OPERATING PRACTICE
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- ACFT ENTRD HI SPEED SPINNING STALL,ALT EST 1200-1500FT IN PROCESS OF PULLING UP WHEN STRUCK WATER.

3-3014	9/23/73 TIME - 1530	HOLLY,MICH	CESSNA A150L N6047J DAMAGE-DESTROYED INTENDED DESTINATION LOCAL	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 23, 130 TOTAL HOURS, 3 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
SALEM,MICH
TYPE OF ACCIDENT
STALL SPIN

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- LOST CTL DRG LOW ALT ROLL NEAR RELATIVES HOUSE.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3090	10/9/73 TIME - 1250	FRANKLIN,IND	CORBIN B-ACE N10BA DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, FL.INSTR., AGE 22, 2050 TOTAL HOURS, 10 IN TYPE, INSTRUMENT RATED

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES	F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-3090	10/9/73 TIME - 1250	FRANKLIN,IND	CORBIN B-ACE N10BA DAMAGE-DESTROYED	CR- PX-	1 0	0 0	0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, FL.INSTR., AGE 22, 2050 TOTAL HOURS, 10 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - FRANKLIN FIELD
DEPARTURE POINT
FRANKLIN,IND
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - CORRECTING LENSES-NOT USED
REMARKS- ACFT-ACROBATICS PROHIBITED.LOOP OBSVD FOLLOWED BY SNAP ROLL.ACFT CONT ROTATING NOSE DWN TO IMPACT.

3-3306	11/18/73 TIME - 1159	SANTA FE,N MEX	BELLANCA 8KCAB N36033 DAMAGE-DESTROYED	CR- PX-	1 0	0 0	0 0	MISCELLANEOUS AIR SHOW/RACING	AIRLINE TRANSPORT, AGE 46, 9700 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - SANTA FE COUNTY
DEPARTURE POINT
SANTA FE,N MEX
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FIRE AFTER IMPACT
REMARKS- COMPLEX LOW ALT ROLL MANEUVER

3-3848	12/16/73 TIME - 1245	LETOHATCHEE,ALA	PITTS S-2A N80029 DAMAGE-DESTROYED	CR- PX-	0 0	0 0	1 1	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 41, 2900 TOTAL HOURS, 54 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
MONTGOMERY,ALA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
REMARKS- INTENTIONAL SPIN PLT DID NOT WAIT LONG ENOUGH WITH RECOVERY CTLS.GR DUG INTO GND DRG RCVRY.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3963	12/8/73 TIME - 1723	SOUTH HAVEN,MICH	CHAMPION 7GCAA N1122 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 37, 8010 TOTAL HOURS, 10 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - SOUTH HAVEN
DEPARTURE POINT
SOUTH HAVEN,MICH
INTENDED DESTINATION
LOCAL
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
STALL SPIN

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - MISJUDGED ALTITUDE
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
REMARKS- BLOOD ALCOHOL LVL 0.23 PCT.ACFT ALT EST FM 750FT TO 1400FT.OWNERS MANUAL-1000FT ACT LOST 3 TURNS.

3-4122	9/9/73 TIME - 1530	HOMESTEAD,FLA	PITTS S-1S N22XP DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	PRIVATE, AGE 34, 2200 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - CURTIS PITTS
DEPARTURE POINT
HOMESTEAD,FLA
INTENDED DESTINATION
LOCAL
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
STALL SPIN

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- PLT ATMTD PULL OUT AT LOW ALT.

3-0118	1/28/74 TIME - 1400	NR.MELBOURNE,FLA	CESSNA A150L N5930J DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	PRIVATE, AGE 22, 98 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
MELBOURNE,FLA
INTENDED DESTINATION
LOCAL
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
STALL SPIN

PROBABLE CAUSE(S)
MISCELLANEOUS - UNDETERMINED
FACTOR(S)
PERSONNEL - OPERATIONAL SUPERVISORY PERSONNEL INADEQUATE GROUND TRAINING-PROCEDURES
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- ACFT OBSVD SPIN INTO OCEAN NOT RCVRD.PLT PARACHUTED DRAGGED ACROSS WAVES WIND FILLED CHUTE-DROWNED

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0394	2/20/74 TIME - 0754	LEBANON,MO	CESSNA 414 N1628T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL CORP/EXEC	COMMERCIAL, AGE 31, 6380 TOTAL HOURS, 3200 IN TYPE, INSTRUMENT RATED.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0394	2/20/74 TIME - 0754	LEBANON,MO	CESSNA 414 N1628T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL CORP/EXEC	COMMERCIAL, AGE 31, 6380 TOTAL HOURS, 3200 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LEBANON MUNICIPAL
DEPARTURE POINT
MEXICO,MO
INTENDED DESTINATION
LEBANON,MO
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
FIRE AFTER IMPACT
REMARKS- LOW LVL ACROBATICS OVER AIRPORT.STALL FOLLOWING RECOVERY FM ROLL.RETURN FM CORP/EXEC PSGR FLT.

3-0831	4/23/74 TIME - 1624	RIO RANCHO,N MEX	CESSNA A150L N6062J DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 27, 150 TOTAL HOURS, 45 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
ALBUQUERQUE,N MEX
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED

3-1033	3/31/74 TIME - 1605	XENIA,OHIO	CHAMPION 7ECA N2536F DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 23, 93 TOTAL HOURS, 67 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - GREEN COUNTY
DEPARTURE POINT
XENIA,OHIO
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
REMARKS- LOW ALT ACROBATICS.ENTERED SPIN,UN RCVR.PLT BLOOD ALCOHOL LVL 100MG%.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1061	4/14/74 TIME - 1345	NR.CLEAR LAKE,CALIF	STITS SA6B N6733C DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 60, 461 TOTAL HOURS, 19 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
LOWER LAKE,CALIF
TYPE OF ACCIDENT
STALL

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- LOW LEVEL ACROBATICS OVR LAKE.ACFT SANK.PLTS URINE ALCOHOL LVL 0.14%.

3-1103	5/27/74 TIME - 1330	WESTERLO,NY	GILMORE 3D N7JG DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, FL.INSTR., AGE 64, 7000 TOTAL HOURS, 180 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - DELP
DEPARTURE POINT
WESTERLO,NY
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
REMARKS- PLANNED 10 TURN SPIN FM 3300FT MSL WITH RCVRY AT 300FT AGL.RCVRD 100FT AGL HIT TREES DRG PULL-UP.

3-2077	7/20/74 TIME - 0830	MT.PLEASANT,TEX	KNIGHT TWST 85B N25C DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 43, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
MT.PLEASANT,TEX
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2152	8/16/74 TIME - 0713	COLFAX,LA	PIPER PA-25 N8826L DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS FERRY	COMMERCIAL, AGE 33, 3631 TOTAL HOURS, 2566 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2152	8/16/74 TIME - 0713	COLFAX,LA	PIPER PA-25 N8826L DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS FERRY	COMMERCIAL, AGE 33, 3631 TOTAL HOURS, 2566 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
COLFAX,LA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FACTOR(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

3-2262	7/22/74 TIME - 1525	STUTTGART,ARK	AERONCA 7AC N82372 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL AERIAL SURVEY	NO CERTIFICATE, AGE 29, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
STUTTGART,ARK
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- EXPIRED MED/STUDENT PLT CERTIFICATE.LOW LVL ACROBATICS.

3-2303	6/29/74 TIME - 1805	FAYETTEVILLE,NC	CESSNA 150L N19266 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 26, 369 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
FAYETTEVILLE,NC
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- BLOOD ALCOHOL LVL 80 MG %. ACFT OBSVD 2ND PASS,90DEG L BANK.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2468	8/18/74 TIME - 1215	KANKAKEE,ILL	PIPER J3C-65 N35258 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	PRIVATE, AGE 43, 705 TOTAL HOURS, 72 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - KOERNER
DEPARTURE POINT
KANKAKEE,ILL
TYPE OF ACCIDENT
STALL SPIRAL

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- LOW LVL ACROBATICS,PRACTICING AIR SHOW.

3-3018	9/1/74 TIME - 1910	WAYNESVILLE,NC	BOEING A75L3 N5118N DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 35, 1000 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - JONATHAN CREEK
DEPARTURE POINT
WAYNESVILLE,NC
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - MISJUDGED ALTITUDE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- DEMONSTRATING ACROBATICS INCLUDING INTENTIONAL SPINS.FAILED TO COMPLETE RECOVERY PRIOR TO IMPACT.

3-3231	9/11/74 TIME - 1700	CLAXTON,GA	BREEZY DP2 N1276 DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PRACTICE	PRIVATE, AGE 43, 1000 TOTAL HOURS, 40 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
CLAXTON,GA
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
REMARKS- PLT ATMTD L SPIN ACFT SPUN R.ACFT ENTRD FLAT SPIN DRG RCVRY.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3276	10/7/74	SOMERVILLE,TENN	BOEING 75	CR- 1 0 0	NONCOMMERCIAL	COMMERCIAL, FL.INSTR.,

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-3276	10/7/74 TIME - 1455	SOMERVILLE,TENN	BOEING 75 N66489 DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 30, 450 TOTAL HOURS, 200 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - OZIER FIELD
DEPARTURE POINT
SOMERVILLE,TENN
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
REMARKS- ACFT OBSVD TO SPIN OUT OF A LOOP.PRIOR TO GND IMPACT NOSE RAISED ABV LVL ATTITUDE,THEN DROPPED.

3-3673	11/11/74 TIME - 1330	FAIRVIEW,OKLA	PIPER J-3 N1504N DAMAGE-DESTROYED	CR- 0 PX- 0	1 0	0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 57, 470 TOTAL HOURS, 300 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
FAIRVIEW,OKLA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- PLT ENTRD INTNTL SPN AT 500FT. DIDNT RECOVR FULLY BEFR STRKNG GRND.

3-4023	12/29/74 TIME - 1530	NR.NEWARK,CALIF	AMER AVCO AA1-A N9443L DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 39, 74 TOTAL HOURS, 3 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
SAN CARLOS,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- LOST CTL DRG LOW ALT WING OVR.CRASHED IN SALT EVAPORATIVE TANK.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4197	12/21/74 TIME - 1115	NR.BRUNSWICK,OHIO	PIPER PA-11 N4703M DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 43, 225 TOTAL HOURS, 66 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - BRUNSWICK
DEPARTURE POINT
VALLEY CITY,OHIO
TYPE OF ACCIDENT
STALL SPIN

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
TERRAIN - SNOW-COVERED
REMARKS- PERFORMED LOOP.AFTER RECOVERY ENTERED SPIN FM ABT 500FT AGL.

WASHINGTON, D.C. 20594

BRIEFS OF ACCIDENTS

ACROBATIC-INFLIGHT PHASE OF OPERATION

1ST TYPE ACCIDENT-AIRFRAME FAILURE IN FLIGHT

U.S. GENERAL AVIATION

1972 THRU 1974

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0152	5/10/72 TIME - 1720	MERCED,CALIF	PITTS S-1S N98X DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 42, 3000 TOTAL HOURS, 100 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MERCED
DEPARTURE POINT
MERCED,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS
IN FLIGHT UNCONTROLLED DESCENT

PROBABLE CAUSE(S)
AIRFRAME - WINGS OTHER
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - SEPARATION IN FLIGHT
FIRE AFTER IMPACT
REMARKS- LWR R WING DISINTEGRATED DURG LOW LVL PRACT FOR AIR SHOW,CAUSE OF MATL FAILURE NOT DETERMINED.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1132	8/3/72 TIME - 1534	MIAMI,FLA	PITTS SPCL S-2A N8028 DAMAGE-SUBSTANTIAL	CR- 0 0 2 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 34, 2550 TOTAL HOURS, 253 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
MIAMI,FLA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
NOSE OVER/DOWN
PHASE OF OPERATION
IN FLIGHT ACROBATICS
LANDING ROLL

PROBABLE CAUSE(S)
AIRFRAME - FLIGHT CONTROL SURFACES HORIZONTAL STABILIZER, ATTACHMENTS
MISCELLANEOUS ACTS,CONDITIONS - FATIGUE FRACTURE
TERRAIN - WET,SOFT GROUND
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
SUSPECTED OR KNOWN AIRCRAFT DAMAGE
REMARKS- R HORIZ STAB FWD ATTACH TUBE FAILED DURING 2 PT ROLL. PLT HAD TO LND FAST IN PLOWED FLD.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1184	7/4/72 TIME - 1225	MCDONALD,PA	ERCO 415-C N94031 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 26, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - CAMPBELLS
DEPARTURE POINT
BRIDGEVILLE,PA
INTENDED DESTINATION
UNKNOWN/NOT REPORTED
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
AIRFRAME - FLIGHT CONTROL SURFACES AILERON SURFACES,ATTACHMENTS
MISCELLANEOUS ACTS,CONDITIONS - CORRODED/CORROSION
MISCELLANEOUS ACTS,CONDITIONS - FLUTTER
MISCELLANEOUS ACTS,CONDITIONS - SEPARATION IN FLIGHT
REMARKS- R AILERON COUNTER WEIGHT SEPARATED IN FLT DURING LOW LEVEL AEROBATICS OVER PLTS HOME.

3-1545	6/18/73 TIME - 1545	GONZALES,CALIF	HAZARD-TURN T-40H N13HH DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	MISCELLANEOUS TEST	COMMERCIAL, AGE 38, 3567 TOTAL HOURS, 4 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
MONTEREY,CALIF
INTENDED DESTINATION
UNKNOWN/NOT REPORTED
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
AIRFRAME - WINGS SPARS
PERSONNEL - PRODUCTION-DESIGN-PERSONNEL SUBSTANDARD QUALITY CONTROL
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- R WG MN SPAR AT R STRUT ATTACH PT WEAKENED BY MISLOCATED DRILLED HOLES.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2334	8/23/73	HOMER,NY				

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2334	8/23/73 TIME - 1830	HOMER,NY	JEANIES TEENIE N31JT DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	NO CERTIFICATE, AGE 41, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - BERO
DEPARTURE POINT
HOMER,NY
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
SYSTEMS - FLIGHT CONTROL SYSTEMS RUDDER AND RUDDER TAB CONTROL SYSTEM
MISCELLANEOUS ACTS,CONDITIONS - DISCONNECTED
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE MAINTENANCE AND INSPECTION
FACTOR(S)
MISCELLANEOUS - UNQUALIFIED PERSON OPERATED AIRCRAFT
REMARKS- ROD END BEARING ATTACH PUSH-PULL TORQUE TUBE TO RUDDER CTL HORN FAILED.ACFT & PLT UNCERTIFICATED.

3-3704	10/6/73 TIME - 1100	MORRIS,ILL	BELLANCA 7GCBC N36034 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL BUSINESS	PRIVATE, AGE 28, 303 TOTAL HOURS, 12 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
MORRIS,ILL
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - EXCEEDED DESIGNED STRESS LIMITS OF AIRCRAFT
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- ENTERED ACROBATIC MANEUVER AT TOO LOW ALT TO EFFECT SAFE RECOVERY.R WING FAILED.

3-1676	5/24/74 TIME - 1700	NR.GILROY,CALIF	BELLANCA 8KCAB N41817 DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 30, 2968 TOTAL HOURS, 8 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - SOUTH COUNTY
DEPARTURE POINT
SAN JOSE,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXCEEDED DESIGNED STRESS LIMITS OF AIRCRAFT
PILOT IN COMMAND - INCAPACITATION
REMARKS- PLT STATED HE BLACKED OUT DRG HI G LOADS. BOTH WGS DEFORMED. PLT LND OK.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1997	7/17/74 TIME - 1330	NEWTON,KANS	BEDE BD-5J N152BD DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 27, 4592 TOTAL HOURS, 79 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
NEWTON,KANS
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
AIRFRAME - FUSELAGE WINDSHIELDS,WINDOWS,CANOPIES
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
REMARKS- STEEP DESCENT-230KTS(VNE 250KTS). CANOPY FAILD HITTNG PLT IN HEAD. ACFT SUBJECTD TO APPROX 15G.

3-2076	5/27/74 TIME - 1141	SALEM,OREG	MAY FLYBABY 1 N93003 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 54, 1925 TOTAL HOURS, 3 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - PRIVATE STRIP
DEPARTURE POINT
SALEM,OREG
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXCEEDED DESIGNED STRESS LIMITS OF AIRCRAFT
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
FACTOR(S)
AIRFRAME - WINGS SPARS
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
MISCELLANEOUS ACTS,CONDITIONS - SEPARATION IN FLIGHT
REMARKS- RIGHT WING SEPARATED DURING PROHIBITED LOOP MANEUVERS.

3-4120	12/21/74 TIME - 1415	VERBANK,NY	AVION MUDRY CAP10B N80DE DAMAGE-DESTROYED	CR- 0 0 2 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 26, 730 TOTAL HOURS, 300 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
VERBANK,NY
TYPE OF ACCIDENT
AIRFRAME FAILURE IN FLIGHT

INTENDED DESTINATION
LOCAL

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS - FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS
SYSTEMS - FLIGHT CONTROL SYSTEMS ELEVATOR AND ELEVATOR TAB CONTROL SYSTEM
MISCELLANEOUS ACTS,CONDITIONS - JAMMED
REMARKS- PREFLT,CABLE TENSION TOOL INADVERTENTLY LEFT ON RUDDER CABLE JAMMED ELEV BELLCRANK,PARACHUTED OK.

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20594

BRIEFS OF ACCIDENTS

ACROBATIC-INFLIGHT PHASE OF OPERATION

1ST TYPE ACCIDENT-COLLISION WITH GROUND/WATER,

WIRES/POLES AND TREES

U.S. GENERAL AVIATION

1972 THRU 1974

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0151	5/12/72 TIME - 1900	WOODLAKE,CALIF	PITTS S-1S N1151H DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 43, 2200 TOTAL HOURS. 150 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
WOODLAKE,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
FIRE AFTER IMPACT
REMARKS- PRACTICING FOR AIR SHOW.HIT GND DRG RCVRY FRM ACROBATIC MANUEVER.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0284	1/18/72 TIME - 1740	SANGER,TEX	CHAMPION 7GCBC N5081X DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	AIRLINE TRANSPORT, AGE 43, 10000 TOTAL HOURS, 25 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
SANGER,TEX
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- ACFT ENTERED SPIN APRXLY 1500FT AGL,SPIN WAS ARRESTED TOO LOW.HIT GND IN STEEP NOSE-DOWN ATTITUDE.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0446	5/10/72 TIME - 1410	PERRIS,CALIF	STARDUSTER SA-300 N14257 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 52, UNK/NR TOTAL HOURS, 200 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - PERRIS VALLEY
DEPARTURE POINT
PERRIS,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- HIT GRND IN ALMOST LEVEL ATTITUDE DURING LOW ALT SPLIT S RECOVERY. PRACTICE FOR F[illegible]TURE AIR SHOW.

3-0462	6/3/72 TIME - 1755	NR.SOUTH BEND,IND	CESSNA 188A N9936G DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	COMMERCIAL AERIAL APPLICATION	COMMERCIAL, AGE 46, 12000 TOTAL HOURS, 451 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
NEW CARLISLE,IND
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

SPECIAL DATA
TOTAL HOURS IN CROP CONTROL - 9000
KIND OF CROP - BEANS
PILOT'S SEAT BELT - FASTENED-PROPERLY
GOGGLES - USED
COCKPIT CRASHPAD - INSTALLED
TANK/HOPPER-LOCATION - FORWARD OF PILOT
ELEVATION-AREA BEING TREATED-FEET - 285
KIND OF OPERATION - SEEDING CROP
TYPE OF CHEMICAL USED - UNKNOWN/N[illegible]OT REPORTED
GLOVES - USED
CRASH HELMET - AVAILABLE-USED
CRASH BAR - INSTALLED
TERRAIN-TYPE - LEVEL,FLAT
SWATH RUN-HOW FLOWN - DOWNWIND
REMARKS- PLT ATTEMPTED LOW ALT ROLL AFTER SEEDING COMPLETED. BLOOD ALCOHOL LEVEL 0.076 P[illegible]T.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0487	6/15/72 TIME - 1155	CRYSTAL LAKE,ILL	LOWERS BIRD N591T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	[illegible]PORT, AGE 30, 4191 TOTAL HOURS, 27 IN TYPE, INSTRUMENT RATED.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0487	6/15/72 TIME - 1155	CRYSTAL LAKE,ILL	LOWERS BIRD N591T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	AIRLINE TRANSPORT, AGE 30, 4191 TOTAL HOURS, 27 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - CRYSTAL LAKE
DEPARTURE POINT
CRYSTAL LAKE,ILL
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISSING AIRCRAFT - LATER RECOVERED
REMARKS- OBS SAW ACFT ROLLING IN 45 DEG DIVE. DIDNT SEE IMPACT. RECOVERED FROM SWAMP 6/15/72.CHUTE NOT USED

3-1091	7/30/72 TIME - 1845	WINDSOR,VA	CHAMPION 7KCAB N7564F DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 22, 500 TOTAL HOURS, 100 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
WAKEFIELD,VA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- OBS SAW PLT PERFORM 2 LOW ALT ROLLS AND LOOPS.THEN PLT SPUN FROM HAMMERHEAD.HIT TREES ON RECOVERY.

3-1176	8/12/72 TIME - 1345	SHERRILLS FORD,NC	CHAMPION 7GCAA N6398N DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 39, 1873 TOTAL HOURS, 63 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LONG ISLAND
DEPARTURE POINT
HICKORY,NC
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
REMARKS- PLT MEDICAL RESTRICTION-GLASSES FOR DISTANT VISION.NO CORRECTING LENSES FOUND.RECOVERY FROM SPIRAL

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1672	7/6/72 TIME - 2045	THIEF RVR FL,MINN	N.AMERICAN SNJ-4 N7056C DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 38, 8020 TOTAL HOURS, 250 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - THIEF RIVER FALLS
DEPARTURE POINT
THIEF RVR FL,MINN
INTENDED DESTINATION
LOCAL
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER UNCONTROLLED

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED SPEED AND ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- LOW LEVEL AEROBATICS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2321	7/2/72 TIME - 1720	LOVINGTON,N MEX	TAYLORCRAFT BC12-D N5016M DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 34, 440 TOTAL HOURS, 63 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - LEA CNTY-LOVINGTN
DEPARTURE POINT
LOVINGTON,N MEX
INTENDED DESTINATION
LOCAL
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- SLOW ROLL OVR RWY,OUTSIDE AUZD AREA.ACFT MDFD,EXPERIMENTAL CERT,LYC O-290 ENG.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3705	8/7/72 TIME - 1935	MCCORDSVILLE,IND	CHAMPION 7ECA N1623G DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 24, 1693 TOTAL HOURS, 349 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - BROOKSIDE
DEPARTURE POINT
GREENWOOD,IND
INTENDED DESTINATION
ANDERSON,IND
PHASE OF OPERATION
IN FLIGHT ACROBATICS
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE
FACTOR(S)
PILOT IN COMMAND - LACK OF FAMILIARITY WITH AIRCRAFT
REMARKS- BARREL ROLL,LOOP,SLOW ROLL,APRX 700-1600FT AGL.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4154	3/13/72 TIME - 1010	CARSON CITY,NEV	PITTS SC-1 N2703B	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 31, 3599 TOTAL HOURS. UNK/NR IN

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4154	3/13/72 TIME - 1010	CARSON CITY,NEV	PITTS SC-1 N2703B DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	COMMERCIAL, AGE 31, 3599 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
CARSON CITY,NEV
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- DURING LOW LEVEL AEROBATICS ACFT DOVE TO GND IN VERT NOSE DWN ATT.

3-0126	1/30/73 TIME - 1800	AURORA,COLO	BELLANCA 17-31A N39860 DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	MISCELLANEOUS DEMONSTRATION	PRIVATE, AGE 29, 64 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
BROOMFIELD,COLO
INTENDED DESTINATION
RETURN
LAST ENROUTE STOP
LITTLETON,COLO
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED CLEARANCE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISSING AIRCRAFT - LATER RECOVERED
REMARKS- HIT GRND R WG FIRST IN HI SPEED ROLLING TYPE MANEUVER. RECOVERED 1/31/73.

3-0276	3/17/73 TIME - 1240	MADERA,CALIF	CHAMPION 7KCAB N9027L DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 55, 14301 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - MADERA
DEPARTURE POINT
MADERA,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- ATTEMPTED ACROBATICS AT LOW ALTITUDE.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
√ 3-0452	3/23/73 TIME - 1747	LIVERMORE,CALIF	CESSNA 180A N7869A DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS PARAJUMP (SPORT)	COMMERCIAL, AGE 50, 4803 TOTAL HOURS, 4 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - LIVERMORE
DEPARTURE POINT
LIVERMORE,CALIF
INTENDED DESTINATION
NAPA,CALIF
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - SEAT BELT NOT FASTENED
REMARKS- FOLLOWED PARACHUTISTS TO GRND,BUZZED DROP ZONE,THEN LOST CTL IN LOW ALT AEROBATIC MANEUVER.

3-1894	7/15/73 TIME - 1330	PINETOPS,NC	BELLANCA 17-30A N8867V DAMAGE-DESTROYED	CR- 1 0 0 PX- 3 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 52, 1800 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - PINETOPS-HEDGEPTH
DEPARTURE POINT
PINETOPS,NC
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
FIRE AFTER IMPACT
REMARKS- ACFT SLIPPED,LOST ALT IN LOW LEVEL VERTICLE BANK.

3-1913	6/17/73 TIME - 1408	SHELBY,OHIO	N. AMERICAN SNJ-5 N1042C DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS AIR SHOW/RACING	AIRLINE TRANSPORT, AGE 45, 21000 TOTAL HOURS, 600 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
SHELBY,OHIO
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2276	7/29/73 TIME - 1745	ROCK SPRINGS,WYO	AERONCA 7BCM N2043A	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 47, 1600 TOTAL HOURS, 403 IN TYPE,

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-2276	7/29/73 TIME - 1745	ROCK SPRINGS,WYO	AERONCA 7BCM N2043A DAMAGE-SUBSTANTIAL	CR- PX-	0 0	0 0	1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 47, 1600 TOTAL HOURS, 403 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
ROCK SPRINGS,WYO

INTENDED DESTINATION
LOCAL

TYPE OF ACCIDENT
COLLIDED WITH WIRES/POLES

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS
PILOT IN COMMAND - OPERATED CARELESSLY
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS

3-2944	9/22/73 TIME - 1640	JACKSONVILLE,ARK	CHAMPION 7KCAB N9003L DAMAGE-DESTROYED	CR- PX-	2 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 39, 15000 TOTAL HOURS, 500 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
N. LITTLE ROCK,ARK

INTENDED DESTINATION
LOCAL

TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER

CONTROLLED

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

3-2967	10/14/73 TIME - 1430	MCARTHUR,OHIO	CESSNA A150K N8313M DAMAGE-DESTROYED	CR- PX-	0 0	0 0	1 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, FL.INSTR., AGE 34, 3367 TOTAL HOURS, 1285 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - VINTON COUNTY

DEPARTURE POINT
MCARTHUR,OHIO

INTENDED DESTINATION
LOCAL

TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER

CONTROLLED

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.

REMARKS- LETTER OF COMPETENCE-MINIMUM ALTITUDE 100FT ABV SFC.2 SUCCESSIVE ROLLS L WING HIT GND 2ND ROLL.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2979	10/19/73 TIME - 0800	COMMERCE,TEX	JUNGMEISTER BUCKER N701D DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 21, 371 TOTAL HOURS, 24 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - COMMERCE
DEPARTURE POINT
COMMERCE,TEX
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - MISJUDGED ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- PLT ATTEMPTED A SNAP ROLL 300 FT AGL IN A 3/4 SCALE MODEL JUNGMEISTER ACFT.

3-3542	11/17/73 TIME - 1525	BOGALUSA,LA	PITTS S-2A N80022 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 59, 1000 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - CARR MEMORIAL
DEPARTURE POINT
BOGALUSA,LA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - MISJUDGED SPEED AND ALTITUDE
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- LO ALT ACROBATIC FLT,HI-SPD SPLIT-S RECOVERY FM INVERTED FLT,HIT TREES.

3-4170	12/23/73 TIME - 1607	LEESBURG,FLA	PITTS S1C N7J DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 49, 2000 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - LEESBURG MUNI
DEPARTURE POINT
LEESBURG,FLA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- ACFT ROLLED TO INVERTED PSN ABT 250FT AGL,ALT LOST,ROLL RVRSD HIT GND BFR REACHING WING LVL FLT.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0405	2/10/74 TIME - 0820	CANON CITY,COLO	BELLANCA 7KCAB N90918 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 30, 3013 TOTAL HOURS.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-0405	2/10/74 TIME - 0820	CANON CITY,COLO	BELLANCA 7KCAB N90918 DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 30, 3013 TOTAL HOURS, 280 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - FREMONT COUNTY
DEPARTURE POINT
CANON CITY,COLO
INTENDED DESTINATION
LITTLETON,COLO
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
MISCELLANEOUS ACTS,CONDITIONS - DISREGARD OF GOOD OPERATING PRACTICE
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- LOW LEVEL ROLL INITIATED FM 100FT AGL.UN TO COMPLETE RECOVERY BEFORE IMPACT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-0638	3/14/74 TIME - 1525	SILVER CITY,N MEX	CESSNA 172A N7284T DAMAGE-DESTROYED	CR- 1 PX- 0	0 0	0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 46, 1327 TOTAL HOURS, 1213 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
DEMING,N MEX
INTENDED DESTINATION
SILVER CITY,N MEX
TYPE OF ACCIDENT
COLLIDED WITH WIRES/POLES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
PILOT IN COMMAND - FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
REMARKS- LO LVL ACROBATICS.HIT LIGHT POLE ON RCVRY.BLOOD ALC LVL 174MG%.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0924	4/14/74 TIME - 1120	SANTA PAULA,CALIF	STARDUSTER SA-100 N50WP DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 51, 5362 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - SANTA PAULA
DEPARTURE POINT
SANTA PAULA,CALIF
INTENDED DESTINATION
VAN NUYS,CALIF
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED DISTANCE,SPEED,ALTITUDE OR CLEARANCE
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FIRE AFTER IMPACT
REMARKS- ACFT OBSVD IN LOW ALT ACROBATIC MANEUVERS PRIOR TO IMPACT.

3-1376	4/16/74 TIME - 1815	CORNELIUS,OREG	PIPER J3C-65 N92304 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 26, 337 TOTAL HOURS, 212 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - SKYPORT
DEPARTURE POINT
CORNELIUS,OREG
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- ACFT TOO LOW TO EFFECT RECOVERY FROM SPIN.PRACTICING ACROBATIC MANEUVERS INCLUDING SPINS.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1610	6/14/74 TIME - 0845	NR.HOYT,COLO	CALLAIR A-9B N7773V DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	COMMERCIAL ASSOC CROP CTL ACTIVITY	AIRLINE TRANSPORT, AGE 46, 14200 TOTAL HOURS, 31

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1610	6/14/74 TIME - 0845	NR.HOYT,COLO	CALLAIR A-9B N7773V DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	COMMERCIAL ASSOC CROP CTL ACTIVITY	AIRLINE TRANSPORT, AGE 46, 14200 TOTAL HOURS, 31 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
BRIGHTON,COLO

INTENDED DESTINATION
HOYT,COLO

TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER

CONTROLLED

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED SPEED AND ALTITUDE
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

SPECIAL DATA
TOTAL HOURS IN CROP CONTROL - 2500
KIND OF CROP - GRAIN FIELDS
PILOT'S SEAT BELT - FASTENED-PROPERLY
GOGGLES - NOT USED
COCKPIT CRASHPAD - INSTALLED
TANK/HOPPER-LOCATION - FORWARD OF PILOT
ELEVATION-AREA BEING TREATED-FEET - 5200

KIND OF OPERATION - FERRY
TYPE OF CHEMICAL USED - LIQUID CHEMICAL-NONTOXIC
GLOVES - USED
CRASH HELMET - AVAILABLE-USED
CRASH BAR - INSTALLED
TERRAIN-TYPE - LEVEL,FLAT

REMARKS- LOW ALT ACROBATICS.RETURNING FRM AG FLT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1703	7/13/74 TIME - 1441	PLUM ISLAND,MASS	GLOBE GC-1B N3342K DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 46, 960 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - PLUM ISLAND
DEPARTURE POINT
PLUM ISLAND,MASS

INTENDED DESTINATION
LOCAL

TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER

CONTROLLED

PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
PILOT IN COMMAND - MISJUDGED ALTITUDE

REMARKS- ACFT OBSVD PERFORMING AEROBATIC MANEUVERS AT EST ALT 3-500FT AGL.VCNTY PLUM ISLAND ARPT.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1709	5/24/74 TIME - 1910	SCOTTSVILLE,VA	BELLANCA 8KCAB N68559 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	PRIVATE, AGE 35, 495 TOTAL HOURS, 12 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - LITTLE FARM STRIP
DEPARTURE POINT
SCOTTSVILLE,VA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
PILOT IN COMMAND - MISJUDGED ALTITUDE
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
REMARKS- INVERTED FLT.INVERTED CLB ABT VERT ATTITUDE.BEGAN TAIL-SLIDE,ATMPT SPLIT-S OUT.ALT 3-500 FT AGL.

3-1847	7/28/74 TIME - 1939	ARCHDALE,NC	BELLANCA 7GCBC N8953 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 50, 12825 TOTAL HOURS, 45 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - DARR FIELD
DEPARTURE POINT
ARCHDALE,NC
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - ATTEMPTED OPERATION W/KNOWN DEFICIENCIES IN EQUIPMENT
FIRE AFTER IMPACT
REMARKS- ACFT NOT EQPD WITH INVERTED FUEL SYS-LVLD OFF ABT 200FT,ROLLED L NOSE PITCHED UP THEN FELL THRU.

3-2283	7/12/74 TIME - 0630	NR.TACOMA,WASH	CESSNA 180C N9321T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS UNKNOWN/NOT REPORTED	COMMERCIAL, AGE 30, 2496 TOTAL HOURS, 106 IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
TACOMA,WASH
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
MISCELLANEOUS - UNDETERMINED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- ACFT PASSED UNDER NARROWS BRIDGE,PULLED UP INTO LOOP-TYPE MAN,FELL OUT NR TOP.ACFT NOT RECOVERED.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA

APPENDI

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2630	9/8/74 TIME - UNK/NR	HIGHGROVE,CALIF	PITTS SPL S-1C N7021 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 29, 2500 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
RUBIDOUX,CALIF
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
MISSING AIRCRAFT - LATER RECOVERED
REMARKS- DOING AEROBATICS & DISAPPEARED FROM SIGHT.ACFT WRECKAGE FOUND NEXT DAY IN AREA LAST SEEN.

3-2708	9/19/74 TIME - 1200	PARKIN,ARK	CESSNA 150L N11958 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 32, 387 TOTAL HOURS, 78 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
PARKIN,ARK
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- ATTMPTD LOW ALT WING OVER.

3-2759	8/18/74 TIME - 1125	PAPILLION,NEBR	BELLANCA 8KCAB N41806 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PRACTICE	PRIVATE, AGE 53, 2617 TOTAL HOURS, 99 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - DIXON PRIVATE
DEPARTURE POINT
PAPILLION,NEBR
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
REMARKS- MEDICAL EVIDENCE INDICATES PLT HAD MODERATE TO SEVERE ATHEROSCLEROSIS.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2992	9/10/74 TIME - 1540	NR.JACKSONVILLE,FLA	PIPER PA-28 N4293T DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 32, 255 TOTAL HOURS, 20 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
TAMPA,FLA
INTENDED DESTINATION
CHARLESTON,SC
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- PLT BLOOD ALCOHOL LEVEL 0.24 PERCENT.PLT ANNOUNCED TO PAX HE WOULD DEMONSTRATE ACFT CAPABILITIES.

3-3031	10/4/74 TIME - 1830	HUNTINGTON,W VA	PIPER PA-22 N1822P DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 47, 400 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - NEWLON FIELD
DEPARTURE POINT
HUNTINGTON,W VA
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
FACTOR(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
TERRAIN - HIGH OBSTRUCTIONS
REMARKS- BLOOD ALCOHOL LVL 70 MG PCT.STRUCK TREES DRG PULL UP FM SPLIT S.

3-3099	9/8/74 TIME - 1315	S WEYMOUTH,MASS	BELLANCA 8KCAB N86589 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 31, 562 TOTAL HOURS, 233 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - NAAS S WEYMOUTH
DEPARTURE POINT
S WEYMOUTH,MASS
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
FIRE AFTER IMPACT
REMARKS- AUTH LMTD 500FT AGL.AFTR SPIN ROTATION STOPPED ACFT OBSVD HALF TWIST BFR ALMOST VERT DSCNT.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3127	10/6/74 TIME - 1300	NEW CASTLE,IND	BELLANCA 8KCAB N31295 DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 45, 3690 TOTAL HOURS, 122 IN TYPE,

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES	F	S	M/N	FLIGHT PURPOSE	PILOT DATA
3-3127	10/6/74 TIME - 1300	NEW CASTLE,IND	BELLANCA 8KCAB N31295 DAMAGE-DESTROYED	CR- PX-	0 0	1 0	0 0	MISCELLANEOUS AIR SHOW/RACING	COMMERCIAL, AGE 45, 3690 TOTAL HOURS, 122 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - SKYCASTLE
DEPARTURE POINT
NEW CASTLE,IND
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS
FACTOR(S)
WEATHER - DOWNDRAFT,UPDRAFTS
WEATHER BRIEFING - NO BRIEFING RECEIVED
WEATHER FORECAST - UNKNOWN/NOT REPORTED

SKY CONDITION
BROKEN
CEILING AT ACCIDENT SITE
10000
VISIBILITY AT ACCIDENT SITE
5 OR OVER
PRECIPITATION AT ACCIDENT SITE
NONE
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
NONE
RELATIVE BEARING OF WIND
RIGHT QUARTERING TAIL WIND 113-157 DEGREES
TEMPERATURE-F
73
WIND DIRECTION-DEGREES
220
WIND VELOCITY-KNOTS
12
TYPE OF WEATHER CONDITIONS
VFR
TYPE OF FLIGHT PLAN
NONE

3-3399	8/18/74 TIME - 1325	WASECA,MINN	ZIMMERMAN S-1C N5191 DAMAGE-SUBSTANTIAL	CR- PX-	0 0	1 0	0 0	MISCELLANEOUS AIR SHOW/RACING	AIR,FLIGHT INSTR., AGE 40, 13200 TOTAL HOURS, 100 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - WASECA MUNI
DEPARTURE POINT
WASECA,MINN
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER
CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
REMARKS- SPIN DEMO,LATE RECOVERY.STOPPED ROTATION,HIT GND DRG RECOVERY.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3439	6/20/74 TIME - 1655	STEPHEN,MINN	CALLAIR A-9 N7238V DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 0	COMMERCIAL ASSOC CROP CTL ACTIVITY	COMMERCIAL, AGE 22, 766 TOTAL HOURS, 350 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
STEPHEN,MINN
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING

SPECIAL DATA
TOTAL HOURS IN CROP CONTROL - 766
KIND OF CROP - GRAIN FIELDS
GLOVES - NOT USED
CRASH HELMET - AVAILABLE-USED
CRASH BAR - INSTALLED
TERRAIN-TYPE - LEVEL,FLAT
KIND OF OPERATION - SPRAYING CROPS
TYPE OF CHEMICAL USED - LIQUID CHEMICAL-NONTOXIC
GOGGLES - NOT USED
COCKPIT CRASHPAD - INSTALLED
TANK/HOPPER-LOCATION - FORWARD OF PILOT
ELEVATION-AREA BEING TREATED-FEET - 850
REMARKS- ACFT OBSERVED MAKING LOOP AT LOW ALTITUDE.PLT HAD COMPLETED SPRAYIND AND WAS RETURNING TO BASE.

3-3818	12/19/74 TIME - 1230	NR.WASCO,OREG	CESSNA 120 N2124V DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 24, 22 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
WASCO,OREG
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
FACTOR(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PERSONNEL - FLIGHT INSTRUCTOR INADEQUATE TRAINING OF STUDENT
REMARKS- PLT OWNED ACFT.CRASHED DRG RECOVERY FROM ACROBATIC MANEUVER.

3-3837	11/24/74 TIME - 1730	MORGANTON,NC	CESSNA 150J N60581 DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 28, 3000 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

DEPARTURE POINT
MORGANTON,NC
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED ALTITUDE
FACTOR(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
[illegible] OF ROTATION AT GND IMPACT.

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20594

BRIEFS OF ACCIDENTS

ACROBATIC-INFLIGHT PHASE OF OPERATION

1ST TYPE ACCIDENT-ENGINE FAILURE OR MALFUNCTION

U.S. GENERAL AVIATION

1972 THRU 1974

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0388	1/26/72 TIME - 1245	TOPSAIL,NC	CESSNA 150 N6285G DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 31, 186 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
WILMINGTON,NC

INTENDED DESTINATION
LOCAL

TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
COLLIDED WITH OBJECT

PHASE OF OPERATION
IN FLIGHT ACROBATICS
LANDING ROLL

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
PILOT IN COMMAND - MISMANAGEMENT OF FUEL
MISCELLANEOUS ACTS,CONDITIONS - FUEL EXHAUSTION
TERRAIN - OTHER

COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- PRACTICE STALL-SPIN FLT,FEXHA DURG SPIN,LNDD ON RD,WING HIT RD SIGN.

BRIEFS OF ACCIDENTS

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2597	7/1/73 TIME - 1100	NR.MONMOUTH,OREG	STORY MK-7 N1269 DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 36, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - FETTER
DEPARTURE POINT
MONMOUTH,OREG
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
IN FLIGHT ACROBATICS
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED DISTANCE,SPEED,ALTITUDE OR CLEARANCE
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
POWERPLANT - ENGINE STRUCTURE OTHER
FACTOR(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
REMARKS- PLT ATMTD LOOP.ENG NOT EQPD FOR INVERTED FLT.ENGFAILED AT TOP OF LOOP.

LIST OF ABBREVIATIONS USED IN BRIEFS

ABBREVIATION	MEANING
AERIAL ADVERTISE	AERIAL ADVERTISING
ATR,FLIGHT INSTR.	ATRLINE TRANSPORT INSTRUCTOR

LIST OF ABBREVIATIONS USED IN BRIEFS

ABBREVIATION	MEANING
AERIAL ADVERTISE	AERIAL ADVERTISING
ATR.FLIGHT INSTR.	AIRLINE TRANSPORT INSTRUCTOR
AIR SHOW/RACING	AIR SHOW/AIR RACING
AIR TAXI-CARGO	AIR TAXI-CARGO OPERATIONS
AIR TAXI-PASSG	AIR TAXI-PASSENGER OPERATIONS
APPROACH CTL-DEPARTURE	APPROACH CONTROL-DEPARTURE
APR CTL-TOW ENRT CTL SRV	APPROACH CONTROL-TOWER EN ROUTE CONTROL SERVICE
ASSOC CROP CTL ACTIVITIES	ASSOCIATED CROP CONTROL ACTIVITIES
ASSOC FIRE CTL ACTIVITIES	ASSOCIATED FIRE CONTROL ACTIVITIES
COMMERCIAL.FLIGHT.INSTR.	COMMERCIAL FLIGHT INSTRUCTOR
CORP/EXEC	CORPORATE/EXECUTIVE
CR-	CREW
CTR CARGO-D	CONTRACT/CHARTER-CARGO-DOMESTIC
CTR CARGO-I	CONTRACT/CHARTER-CARGO-INTERNATIONAL
CTR PASSG-D	CONTRACT/CHARTER-PASSENGER-DOMESTIC
CTR PASSG-I	CONTRACT/CHARTER-PASSENGER-INTERNATIONAL
LAST ENROUTE STOP	LAST PLANNED EN ROUTE LANDING POINT
MAPPING/PHOTO	AERIAL MAPPING/PHOTOGRAPHY
MIL CONTRACT CARGO INTL	MILITARY CONTRACT-CARGO-INTERNATIONAL
MIL CONTRACT PASS6 INTL	MILITARY CONTRACT-PASSENGER-INTERNATIONAL
MILITARY CTR CARGO DOM	MILITARY CONTRACT-CARGO-DOMESTIC
MILITARY CTR PASSG DOM	MILITARY CONTRACT-PASSENGER-DOMESTIC
MIL/CTR CARGO	MILITARY CONTRACT-CARGO
MIL/CTR PASSG	MILITARY CONTRACT-PASSENGER
NR.	NEAR
NS CTR CARGO	NONSCHEDULED/CHARTER REVENUE CARGO-INTRA-STATE
NS CTR PASSG	NONSCHEDULED/CHARTER REVENUE PASSENGER-INTRA-STATE
NS/CTR REVENUE CARGO DOM	NONSCHEDULED/CHARTER REVENUE CARGO-DOMESTIC
NS/CTR REVENUE CARGO INTL	NONSCHEDULED/CHARTER REVENUE CARGO-INTERNATIONAL
NS/CTR REVENUE PASSG DOM	NONSCHEDULED/CHARTER REVENUE PASSENGER-DOMESTIC
NS/CTR REVENUE PASSG INTL	NONSCHEDULED/CHARTER REVENUE PASSENGER-INTERNATL
OT-	OTHER AIRCRAFT AND GROUND
PARAJUMP	PARACHUTE JUMP
PRIVATE.FL.INST R.	PRIVATE FLIGHT INSTRUCTOR
PX-	PASSENGERS
RADAR CTL/SURVEILLANCE	RADAR CONTROL/SURVEILLANCE
SCHED CARGO SRV	SCHEDULED CARGO SERVICE
SCHED DOM CARGO SRV	SCHEDULED DOMESTIC CARGO SERVICE
SCHED DOM PASSG SRV	SCHEDULED DOMESTIC PASSENGER SERVICE
SCHED INTERNATL CARGO SRV	SCHEDULED INTERNATIONAL CARGO SERVICE
SCHED INTERNATL PASSG SRV	SCHEDULED INTERNATIONAL PASSENGER SERVICE
SCHED PASSG SRV	SCHEDULED PASSENGER SERVICE
S-D	SCHEDULED-DOMESTIC
S-I	SCHEDULED-INTERNATIONAL
UNK/NR	UNKNOWN/NOT REPORTED

APPENDIX C

TABLES

APPENDIX C

Table 1

ACROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

	INJURIES					
	FATAL	SERIOUS	MINOR	NONE	UNKNOWN	TOTAL
PILOT	77	13	8	6		104
COPILOT	7					7
DUAL STUDENT	1	2	1	1		5
CHECK PILOT	1					1
FLIGHT ENGINEER						
NAVIGATOR						
CABIN ATTENDANT						
EXTRA CREW						
PASSENGERS	21	6	1	1		29
TOTAL	107	21	10	8	ABOARD	146
OTHER AIRCRAFT						
OTHER GROUND						
GRAND TOTAL	107	21	10	8		146

INVOLVES 105 TOTAL ACCIDENTS
INVOLVES 78 FATAL ACCIDENTS

APPENDIX C

Table 2

KIND OF FLYING BY INJURY INDEX
ACROBATICS-INFLIGHT PHASE OF OPERATION
U.S. GENERAL AVIATION
1972 - 1974

TRA 101	TRA 427									
	NONE	F	C	M	N	Z	OTHER	RECORDS	ACCIDENTS	PERCENT
NONE										
DUAL		2	1	1	1			5	5	4.76
SOLO		3						3	3	2.86
CHECK										
TRAINING										
PLEASURE		47	6	2	3			58	58	55.24
PRACTICE		11	1	2	2			16	16	15.24
BUSINESS		2						2	2	1.90
CORPORATE/EXECUTIVE		1						1	1	.95
AERIAL SURVEY		1						1	1	.95
COMPANY FLIGHT										
OTHER										
AERIAL APPLICATION		1						1	1	.95
CROP CONTROL RELATED FLIGHT		1	2					3	3	2.86
FIRE CONTROL										
FIRE CONTROL RELATED FLIGHT										
AERIAL MAPPING/PHOTOGRAPHY										
AERIAL ADVERTISING										
POWER AND PIPELINE PATROL		1						1	1	.95
FISH SPOTTING										
AIR TAXI-PASSENGER OPERATIONS										
AIR TAXI-CARGO OPERATIONS										
CONSTRUCTION WORK										
SCHEDULED PASSENGER SERVICE										
SCHEDULED CARGO SERVICE										
INTRA-STATE CHARTER PASSG.										
INTRA-STATE CHARTER CARGO.										
MILITARY CONTRACT-PASSENGER										
MILITARY CONTRACT-CARGO										
CHARTER CARGO-DOMESTIC										
CHARTER PASSG-DOMESTIC										
CHARTER-CARGO-INTERNATIONAL										
CHARTER-PASSG-INTERNATIONAL										
OTHER										
UNKNOWN/NOT REPORTED										
EXPERIMENTATION										

APPENDIX C

Table 2 (cont.)

TRA 427

TRA 101	NONE	F	C	M	N	Z	OTHER	RECORDS	ACCIDENTS	PERCENT
TEST		1						1	1	.95
DEMONSTRATION		1						1	1	.95
FERRY		1						1	1	.95
SEARCH AND RESCUE										
AIR SHOW/AIR RACING		3	5	1				9	9	8.57
PARACHUTE JUMP		1						1	1	.95
PARACHUTE JUMP-AIR SHOW										
TOWING GLIDERS										
SEEDING CLOUDS										
HUNTING										
POLICE PATROL										
HIGHWAY TRAFFIC ADVISORY										
ALL OTHER PUBLIC FLYING										
OTHER										
UNKNOWN/NOT REPORTED		1						1	1	.95
OTHER										
RECORDS		78	15	6	6			105		
ACCIDENTS		78	15	6	6				105	
PERCENT	.0	74.3	14.3	5.7	5.7	.0	.0			

TRA 106

NONE

GROUND-

DRAGGED

WHEELS-

WHEELS-

GEAR CO

GEAR RE

HARD LA

NOSE OVE

ROLL OVE

OVERSHOO

UNDERSHO

COLLISIO

BOTH IN

ONE AIRB

BOTH ON

COLLISIO

CONTROLL

UNCONTRO

COLLIDED

WIRES/PO

TREES

RESIDENC

BUILDING

FENCE, F

ELECTRON

RUNWAY O

AIRPORT

ANIMALS

CROP

FLAGMAN

DITCHES

SNOWBANK

PARKED A

AUTOMOBIL

DIRT BANK

Table 3

FIRST TYPE OF ACCIDENT BY INJURY INDEX
ACROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974

TRA 427

TRA 106	NONE	F	C	M	N	Z	OTHER	RECORDS	ACCIDENTS
NONE									
GROUND-WATER LOOP-SWERVE									
DRAGGED WINGTIP POD OR FLOAT									
WHEELS-UP LANDING									
WHEELS-DOWN LANDING IN WATER									
GEAR COLLAPSED									
GEAR RETRACTED									
HARD LANDING									
NOSE OVER/DOWN									
ROLL OVER									
OVERSHOOT									
UNDERSHOOT									
COLLISION BETWEEN AIRCRAFT									
BOTH IN FLIGHT									
ONE AIRBORNE									
BOTH ON GROUND									
COLLISION WITH GROUND/WATER									
CONTROLLED		21	4	2				27	27
UNCONTROLLED		6						6	6
COLLIDED WITH									
WIRES/POLES		1		1				2	2
TREES		7						7	7
RESIDENCE/S									
BUILDING/S									
FENCE, FENCEPOSTS									
ELECTRONIC TOWERS									
RUNWAY OR APPROACH LIGHTS									
AIRPORT HAZARD									
ANIMALS									
CROP									
FLAGMAN LOADER									
DITCHES									
SNOWBANK									
PARKED AIRCRAFT (UNATTENDED)									
AUTOMOBILE									
DIRT BANK									

APPENDIX C

Table 3 (cont.)

TRA 427

TRA 106	NONE	F	C	M	N	Z	OTHER	RECORDS	ACCIDENTS
OTHER									
BIRD STRIKE								13	13
STALL		11	2					36	36
SPIN		25	7	2	2			1	1
SPIRAL		1						1	1
MUSH					1				
FIRE OR EXPLOSION									
IN FLIGHT									
ON GROUND									
AIRFRAME FAILURE								10	10
IN FLIGHT		6	1	1	2				
ON GROUND									
ENGINE TEARAWAY								2	2
ENGINE FAILURE OR MALFUNCTION			1		1				
PROPELLER/ROTOR FAILURE									
PROPELLER									
TAIL ROTOR									
MAIN ROTOR									
PROP ROTOR ACONT TO PERSON									
JET INTAKE/EXH ACONT TO PERS									
PROPELLER/JET/ROTOR BLAST									
TURBULENCE									
HAIL DAMAGE TO AIRCRAFT									
LIGHTNING STRIKE									
EVASIVE MANEUVER									
UNCONTROLLED ALT DEVIATION									
DITCHING									
MISSING ACFT NOT RECOVERED									
MISCELLANEOUS/OTHER									
UNDETERMINED									
OTHER									
RECORDS		78	15	6	6			105	
ACCIDENTS		78	15	6	6				105

Table 4

CAUSE/FACTOR TABLE

ACROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974
EXCLUDES ACCIDENTS WITH NO CAUSAL DETERMINATION

INVOLVES 105 TOTAL ACCIDENTS
INVOLVES 78 FATAL ACCIDENTS

BROAD CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*
PILOT	73 93.59	14 17.95	73 93.59	24 88.89	1 3.70	24 88.89	97 92.38	15 14.29	97 92.38
PERSONNEL	2 2.56	2 2.56	4 5.13	.00	.00	.00	2 1.90	2 1.90	4 3.81
AIRFRAME	2 2.56	2 2.56	4 5.13	2 7.41	.00	2 7.41	4 3.81	2 1.90	6 5.71
LANDING GEAR	.00	.00	.00	.00	.00	.00	.00	.00	.00
POWERPLANT	.00	.00	.00	1 3.70	.00	1 3.70	1 .95	.00	1 .95
SYSTEMS	1 1.28	.00	1 1.28	1 3.70	.00	1 3.70	2 1.90	.00	2 1.90
INSTRUMENTS/EQUIPMENT AND ACCESSORIES	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROTORCRAFT	.00	.00	.00	.00	.00	.00	.00	.00	.00
AIRPORTS/AIRWAYS/FACILITIES	.00	.00	.00	.00	.00	.00	.00	.00	.00
WEATHER	.00	.00	.00	.00	1 3.70	1 3.70	.00	1 .95	1 .95
TERRAIN	.00	6 7.69	6 7.69	2 7.41	3 11.11	5 18.52	2 1.90	9 8.57	11 10.48
MISCELLANEOUS	.00	1 1.28	1 1.28	1 3.70	.00	1 3.70	1 .95	1 .95	2 1.90
UNDETERMINED	2 2.56	.00	2 2.56	1 3.70	.00	1 3.70	3 2.86	.00	3 2.84

THE FIGURES OPPOSITE EACH CAUSAL CATEGORY REPRESENT THE NUMBER AND PERCENT OF ACCIDENTS IN WHICH THAT PARTICULAR CAUSAL CATEGORY WAS ASSIGNED

* IF AN ACCIDENT INCLUDES BOTH A CAUSE AND RELATED FACTOR IN THE SAME CAUSAL CATEGORY, THE ACCIDENT IS REPRESENTED ONCE UNDER THE TOTAL FOR THAT CATEGORY

Table 5

CAUSE/FACTOR TABLE

ACROBATICS - INFLIGHT PHASE OF OPERATION
U. S. GENERAL AVIATION
1972 - 1974
EXCLUDES ACCIDENTS WITH NO CAUSAL DETERMINATION

INVOLVES 105 TOTAL ACCIDENTS
INVOLVES 78 FATAL ACCIDENTS

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** PILOT **									
PILOT IN COMMAND									
ATTEMPTED OPERATION W/KNOWN DEFICIENCIES IN EQUIPMENT	1		1				1		1
ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL	12		12	2	1	3	14	1	15
EXCEEDED DESIGN STRESS LIMITS OF AIRCRAFT	2		2	1		1	3		3
FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS	1		1	1		1	2		2
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	28		28	5		5	33		33
MISJUDGED, SPEED, ALTITUDE OR CLEARANCE	1		1	1		1	2		2
FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC	11	3	14	2	1	3	13	4	17
IMPROPER OPERATION OF FLIGHT CONTROLS	22		22	7		7	29		29
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING	1		1	2		2	3		3
LACK OF FAMILIARITY WITH AIRCRAFT		2	2					2	2
MISMANAGEMENT OF FUEL				1		1	1		1
EXERCISED POOR JUDGMENT	24	2	26	5		5	29	2	31
OPERATED CARELESSLY				2		2	2		2
MISJUDGED SPEED AND ALTITUDE	2	1	3	1		1	3	1	4
MISJUDGED ALTITUDE AND CLEARANCE	8		8	2		2	10		10
MISJUDGED ALTITUDE	20		20	8		8	28		28
MISJUDGED CLEARANCE	1		1				1		1
INCAPACITATION				1		1	1		1
PHYSICAL IMPAIRMENT	3	6	9				3	6	9
SUBTOTAL	137	14	151	41	2	43	178	16	194
** PERSONNEL **									
FLIGHT INSTRUCTOR									
INADEQUATE TRAINING OF STUDENT		1	1					1	1
MAINTENANCE, SERVICING, INSPECTION									
INADEQUATE MAINTENANCE AND INSPECTION	1		1				1		1
OPERATIONAL SUPERVISORY PERSONNEL									
INADEQUATE GROUND TRAINING-PROCEDURES		1	1					1	1
WEATHER PERSONNEL									
TRAFFIC CONTROL PERSONNEL									
AIRPORT SUPERVISORY PERSONNEL									
AIRWAYS FACILITIES PERSONNEL									
PRODUCTION-DESIGN-PERSONNEL									
SUBSTANDARD QUALITY CONTROL	1		1				1		1
MISCELLANEOUS-PERSONNEL									
THIRD PILOT									
FLIGHT ENGINEER									
FLIGHT PERSONNEL									
DISPATCHING (AIR CARRIER ONLY)									
OTHER	2	2	4	2		2	4	2	6
DISPATCHING									
DISPATCHED AIRCRAFT IMPROPERLY EQUIPPED FOR FLIGHT	1	1	2				1	1	2
SUBTOTAL	5	5	10	2		2	7	5	12
** AIRFRAME **									
WINGS									
SPARS	1	1	2				1	1	2
OTHER	1		1				1		1
FUSELAGE									
WINDSHIELDS, WINDOWS, CANOPIES				1		1	1		1
LANDING GEAR									
FLIGHT CONTROL SURFACES									
AILERON, SURFACES ATTACHMENTS		1	1					1	1
HORIZONTAL STABILIZER, ATTACHMENTS				1		1	1		1
SUBTOTAL	2	2	4	2		2	4	2	6

APPENDIX C

Table 5 (cont.)

CAUSE/FACTOR TABLE

POWERPLANT (CONTINUED)	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** POWERPLANT **									
ENGINE STRUCTURE				1		1	1		1
OTHER									
IGNITION SYSTEM									
FUEL SYSTEM									
LUBRICATING SYSTEM									
COOLING SYSTEM									
PROPELLER AND ACCESSORIES									
EXHAUST SYSTEM									
ENGINE ACCESSORIES									
ENGINE CONTROLS-COCKPIT									
POWERPLANT-INSTRUMENTS									
MISCELLANEOUS									
REDUCTION GEAR ASSEMBLY									
COMPRESSOR ASSEMBLY									
COMBUSTION ASSEMBLY									
TURBINE ASSEMBLY									
ACCESSORY DRIVE ASSEMBLY									
LUBRICATING SYSTEM									
FUEL SYSTEM									
SAFETY SYSTEM									
IGNITION SYSTEM									
TORQUEMETER									
AIR BLEED									
EXHAUST SYSTEM									
THRUST REVERSER									
PROPELLER SYSTEM									
CONSTANT SPEED DRIVE									
POWER LEVER									
PROPELLER LEVER									
REVERSE THRUST LEVER									
ENGINE INDICATING EQUIPMENT									
ENGINE INSTALLATION									
SUBTOTAL				1		1	1		1
** SYSTEMS **									
ELECTRICAL SYSTEM									
HYDRAULIC SYSTEM									
FLIGHT CONTROL SYSTEMS				1		1	1		1
ELEVATOR AND ELEVATOR TAB CONTROL SYSTEM	1		1				1		1
RUDDER AND RUDDER TAB CONTROL SYSTEM									
ANTI-ICING, DE-ICING SYSTEMS									
AIR CONDITION, HEATING AND PRESSURIZATION									
AUTO PILOT									
FIRE WARNING SYSTEM									
FIRE EXTINGUISHER SYSTEM									
OXYGEN SYSTEM									
OTHER SYSTEMS									
SUBTOTAL	1		1	1		1	2		2
** WEATHER **									
DOWNDRAFTS, UPDRAFTS					1	1		1	1
SUBTOTAL					1	1		1	1
** TERRAIN **									
WET, SOFT GROUND		1	1	1		1	1		1
SNOW-COVERED		5	5		3	3		1	1
HIGH OBSTRUCTIONS				1		1	1	8	8
OTHER									1
SUBTOTAL		6	6	2	3	5	2	9	11
** MISCELLANEOUS **									
UNQUALIFIED PERSON OPERATED AIRCRAFT		1	1					1	1
FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS				1		1	1		1

Table 5 (cont.)

CAUSE/FACTOR TABLE

MISCELLANEOUS (CONTINUED)

	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
UNDETERMINED	2		2	1		1	3		3
SUBTOTAL	2	1	3	2		2	4	1	5
GRAND TOTAL	147	28	175	51	6	57	198	34	232
** MISCELLANEOUS ACTS, CONDITIONS **									
DISREGARD OF GOOD OPERATING PRACTICE	1		1		1	1	1	1	2
SEAT BELT NOT FASTENED		2	2					2	2
UNWARRANTED LOW FLYING	28	16	44	5		5	33	16	49
CORRECTING LENSES-NOT USED		1	1					1	1
FATIGUE FRACTURE				1		1	1		1
SEPARATION IN FLIGHT		3	3					3	3
CORRODED/CORROSION		1	1					1	1
FUEL EXHAUSTION				1		1	1		1
ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT	3	5	8				3	5	8
IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG		3	3					3	3
INTERFERENCE WITH FLIGHT CONTROLS	1		1				1		1
AIRCRAFT CAME TO REST IN WATER		8	8		2	2		10	10
OVERLOAD FAILURE	1	2	3				1	2	3
MATERIAL FAILURE	1		1	1		1	2		2
DISCONNECTED	1		1				1		1
FLUTTER		1	1					1	1
JAMMED				1		1	1		1

DIRECT ENTRY CAUSES ARE CARRIED UNDER THEIR APPROPRIATE CAUSAL CATEGORIES AND ARE INCLUDED IN THE TOTALS

APPENDIX D

AEROBATIC REGULATIONS
(CFR 91 - General Operating and Flight Rules)

There are several regulations under the General Operating and Flight Rules of Part 91 which relate directly or indirectly to flight operations involving aerobatics. These include:

CFR 91.9 CARELESS OR RECKLESS OPERATION

No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

CFR 91.9.15 PARACHUTES AND PARACHUTING

(a) No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type and-

(1) If a chair type (canopy in back), it has been packed by a certificated and appropriately rated parachute rigger within the preceding 120 days; or

(2) If any other type, it has been packed by a certificated and appropriately rated parachute rigger within the preceding 60 days.

(b) Except in an emergency, no pilot-in-command may allow, and no person may make, a parachute jump from an aircraft within the United States except in accordance with Part 105 of this chapter.

(c) Unless each occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft, carrying any person (other than a crewmember) may execute any intentional maneuver that exceeds-

(1) A bank of 60 degrees relative to the horizon; or

(2) A nose-up or nose-down attitude of 30 degrees relative to the horizon.

(d) Paragraph (c) of this section does not apply to-

(1) Flight tests for pilot certification or rating; or

(2) Spins and other flight maneuvers required by the regulations for any certificate or rating when given by-

(i) A certificated flight instructor; or

(ii) An airline transport pilot instructing in accordance with paragraph 61.163 of this chapter.

APPENDIX D

(e) For the purposes of this section, "approved parachute" means-

(1) A parachute manufactured under a type certificate or a technical standard order (C-23 series); or

(2) A personnel-carrying military parachute identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number.

CFR 91.63 WAIVERS

(a) The Administrator may issue a certificate of waiver amay issue a certificate of waiver authorizing the operation of aircraft in deviation of any rule of this subpart if he finds that the proposed operation can be safely conducted under the terms of that certificate of waiver.

(b) An application for a certificate of waiver under this section is made on a form and in a manner prescribed by the Administrator and may be submitted to any FAA office.

(c) A certificate of waiver is effective as specified in that certificate.

CFR 91.71 ACROBATIC FLIGHT

No person may operate an aircraft in acrobatic flight-

(a) Over any congested area of a city, town, or settlement;

(b) Over an open air assembly of persons;

(c) Within a control zone or Federal airway;

(d) Below an altitude of 1,500 feet above the surface; or

(e) When flight visibility is less than 3 miles. For the purpose of this section, acrobatic flight means an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude or abnormal acceleration, not necessary for normal flight.

APPENDIX E

FAA FLIGHT INSTRUCTOR BULLETIN NO. 18--AIRPLANE SPRINNING

FLIGHT INSTRUCTOR BULLETIN

No. 18

FIB 8/75

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION – CENTRAL REGION

This month's Flight Instructor Bulletin is devoted entirely to excellent information regarding spins contributed by the Cessna Aircraft Company. Hopefully, we will be able to present information regarding flight characteristics of other aircraft in future issues.

The subject of airplane spinning is a complex one, which is often oversimplified during hangar-flying sessions. There are increasing numbers of pilots, including flight instructors, who, because of the structure of present pilot certification requirements, have had little or no training in spins and spin recovery. This has resulted in some confusion and misunderstanding over the behavior of airplanes in spinning flight, and it appears that this lack of understanding may have contributed to some serious accidents. In the interest of expanding each pilot's knowledge and increasing the safety of his operations, we will discuss some factors influencing spin behavior as it pertains to the Cessna Models 150, A150, 172, and 177 which are approved for intentional spins.

The following list summarizes important safety points relative to the performance of intentional spins.

BASIC GUIDELINES FOR INTENTIONAL SPINS

(1) KNOW YOUR AIRCRAFT THOROUGHLY.

(2) PRIOR TO DOING SPINS IN ANY MODEL AIRCRAFT, OBTAIN THOROUGH INSTRUCTION IN SPINS FROM AN INSTRUCTOR FULLY QUALIFIED AND CURRENT IN SPINNING THAT MODEL.

(3) BE FAMILIAR WITH THE PARACHUTE, AIRSPACE AND WEATHER REQUIREMENTS OF FAR 91.15 and 91.71 AS THEY AFFECT YOUR FLIGHT.

(4) CHECK THE AIRCRAFT WEIGHT AND BALANCE TO BE SURE YOU ARE WITHIN THE APPROVED ENVELOPE FOR SPINS.

(5) SECURE OR REMOVE ALL LOOSE COCKPIT EQUIPMENT PRIOR TO TAKEOFF.

(6) BE SURE THE AREA TO BE USED IS SUITABLE FOR SPINS AND IS CLEAR OF OTHER TRAFFIC.

APPENDIX E

(7) ENTER EACH SPIN AT A HIGH ALTITUDE. PLAN RECOVERIES TO BE COMPLETED WELL ABOVE THE MINIMUM LEGAL ALTITUDE OF 1500 FEET ABOVE THE SURFACE.

(8) CONDUCT ALL ENTRIES IN ACCORDANCE WITH THE PROCEDURES RECOMMENDED BY THE MANUFACTURER.

(9) LIMIT YOURSELF TO 2-TURN SPINS UNTIL COMPLETELY FAMILIAR WITH THE CHARACTERISTICS OF YOUR AIRPLANE.

(10) USE THE FOLLOWING RECOVERY PROCEDURES FOR THE CESSNA MODELS 150, 172, AND 177:

(a) VERIFY THAT THE THROTTLE IS IN IDLE AND AILERONS ARE NEUTRAL.

(b) APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.

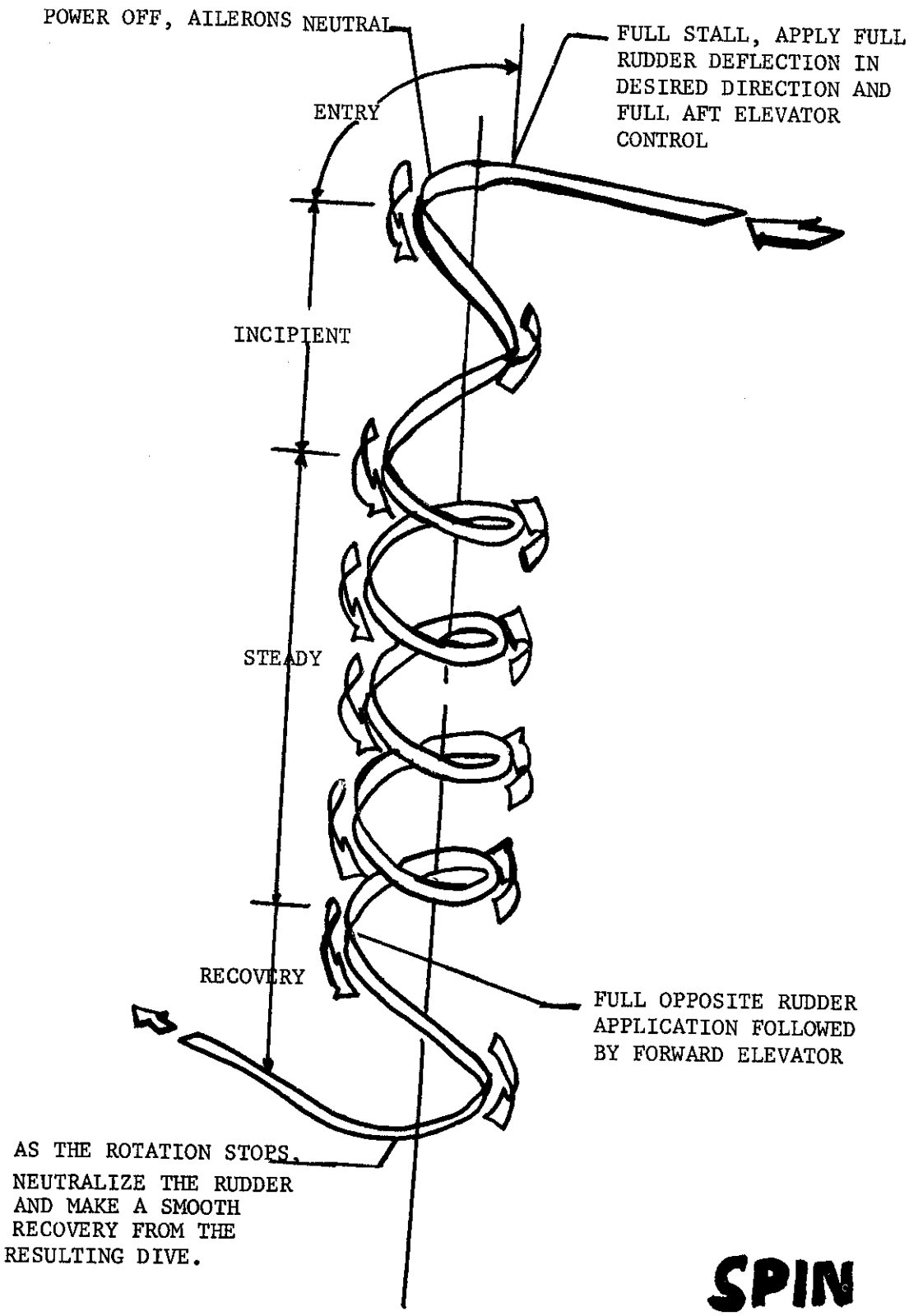
(c) JUST AFTER THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL. Full down elevator may be required at aft center of gravity loadings in some airplane models to assure optimum recoveries.

(d) HOLD THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.

(e) AS THE ROTATION STOPS NEUTRALIZE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

For the purpose of this discussion, we will divide the spin into three distinct phases. These are the entry, incipient, and steady phases. These are illustrated in the figure. The basic cause of a spin is a difference in lift and drag between the two wings with the airplane operating in essentially stalled flight. Entry to this condition is initiated, intentionally or otherwise, when the airplane is stalled in uncoordinated flight. This causes one wing to reach a higher angle of attack than the other. Beyond stall angles of attack, lift begins decreasing while drag rises rapidly. This causes a sustained autorotation to begin because of the decreased lift and increased drag of one wing half as compared to the other.

Here, in the entry phase, recovery from or prevention of the spin is as simple as normal stall recovery since, in fact, at this point that's all we are really faced with. Coordinated use of rudder and aileron to oppose any tendency to roll should be applied with emphasis on the rudder due to its generally more powerful influence at this point. This should be accompanied by relaxation of elevator back pressure to reduce the angle of attack below that of the stall. Coordinated use of all controls should then be applied to return to normal


POWER OFF, AILERONS NEUTRAL
FULL STALL, APPLY FULL RUDDER DEFLECTION IN DESIRED DIRECTION AND FULL AFT ELEVATOR CONTROL
ENTRY
INCIPIENT
STEADY
RECOVERY
FULL OPPOSITE RUDDER APPLICATION FOLLOWED BY FORWARD ELEVATOR
AS THE ROTATION STOPS, NEUTRALIZE THE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

SPIN

APPENDIX E

level flight. During this entry phase recovery of control (or prevention of loss of control) will normally be instantaneous for all practical purposes as soon as the stall is broken.

The second or incipient phase covers that period of time from the spin entry to the fully stabilized spin. During this period the yaw being produced by a deflected rudder while the airplane is stalled is supplemented by the differences in lift and drag between the two wing panels. These parameters cause the rotating motion of the airplane to begin to increase.

During this incipient phase, spin recoveries in those airplanes approved for intentional spins are usually rapid, and, in some airplanes, may occur merely by relaxing the pro-spin rudder and elevator deflections. However, positive spin recovery control inputs should be used regardless of the phase of the spin during which recovery is initiated. Briefly, these control inputs should be 1) power off, 2) full rudder opposite to the direction of rotation, 3) just after the rudder reaches the stop, elevator briskly forward to break the stall, and 4) as rotation stops, neutralize the controls and recover from the resulting dive. Using these procedures, recoveries are typically accomplished in form 1/8 to 1/2 turn during the incipient phase.

The final phase is the fully developed "steady" phase. Here, a more-or-less steady state spin results where the autorotational aerodynamic forces (Yaw due to rudder deflection, lift and drag differences across stalled wing) are balanced by the centrifugal and gyroscopic forces on the airframe produced by the rotating motion. Due to the attitude of the airplane in a spin the total motion is made up of rolling and usually pitching motions as well as the predominant yawing motions. Movement of the airplane flight controls affects the rate of motion about one of the axes. Because of the strong gyroscopic influences in the spin, improper aerodynamic control inputs can have an adverse affect on the spin motion.

Aileron variations from neutral can cause a different balance between the aerodynamic, inertia and gyroscopic forces and cause some delay in recoveries. Typically even a slight inadvertent aileron deflection in the direction of the spin will speed up rotation and delay recoveries. Moving the elevator control forward while maintaining pro-spin rudder deflection may not provide a recovery with some airplanes. In fact, reversing the sequence of rudder-elevator inputs or even just slow, rather than brisk, inputs may lengthen recoveries. Finally, it is <u>important</u>, particularly in this steady spin phase, in addition to using the correct control application and the proper sequence of control application, to HOLD THIS APPLICATION UNTIL THE RECOVERIES OCCUR. In extreme cases, this may require a full turn or more with full down elevator deflection.

The proper recovery control inputs to obtain optimum recovery characteristics in Cessna single engine airplanes are repeated here and amplified somewhat from those listed under the incipient phase.

(1) VERIFY THAT THE THROTTLE IS IN IDLE AND AILERONS ARE NEUTRAL.

(2) APPLY AND HOLD FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.

(3) JUST AFTER THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL BRISKLY FORWARD FAR ENOUGH TO BREAK THE STALL. Full down elevator may be required at aft center of gravity loadings in some airplane models to assure optimum recoveries.

(4) HOLD THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.

(5) AS THE ROTATION STOPS NEUTRALIZE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

The emphasis added to these steps differentiates the steady phase from the incipient phase. The most important difference in the steady phase is an increase in the length of recoveries in this phase for some airplanes, and to a lesser extent the amount of control input needed. Up to a full turn or more to recover is not unusual in this phase. Full down elevator deflection will sometimes be needed to assure optimum recoveries at aft loadings in some airplanes. Therefore IT IS VERY IMPORTANT TO APPLY THE RECOVERY CONTROLS IN THE PROPER SEQUENCE AND THEN HOLD THEM UNTIL RECOVERY OCCURS.

Some of the additional factors which have (or may have) an effect on spin behavior and spin recovery characteristics are aircraft loading (distribution, center of gravity and weight), altitude, power, and rigging.

Distribution of the weight of the airplane can have a significant effect on spin behavior. The addition of weight at any distance from the center of gravity of the airplane will increase its moment of inertia about two axes. This increased inertia independent of the center of gravity location or weight will tend to promote a less steep spin attitude and more sluggish recoveries. Forward location of the c.g. will usually make it more difficult to obtain a pure spin due to the reduced elevator effectiveness. Conversely, extremely aft c.g. locations will tend to promote lengthened recoveries since a more complete stall can be achieved. Changes in airplane gross weight as well as its distribution can have an affect on spin behavior since increases in gross weight will increase inertia. Higher weights may extend recoveries slightly.

High altitudes will tend to lengthen recoveries since the less dense air provides less "bite" for the controls to oppose the spin. However, this does not suggest the use of low altitudes for spin practice.

Airplane rigging can have a strong influence on spin characteristics. Improper elevator and rudder deflection stops can alter the depth of entry into a spin and also can alter the amount of recovery control available. Low cable tensions can alter the amount of travel available at the control surface and may thus reduce the control power available for either entry to an intentional spin or recovery.

APPENDIX E

Power can affect the spinning attitude. If power is carried in the spin the airplane attitude may be less nose down. In addition the propeller will tend to add some gyroscopic inputs which will be reversed between left and right spins. The effect of leaving power on during a spin may lengthen recoveries on some airplanes.

The foregoing areas have considered in the design and certification of an airplane. If the airplane is maintained and operated within manufacturers approved limitations, then spin characteristics and recoveries will be acceptable although the trends mentioned above may be evident.

The next several paragraphs will briefly describe the typical spin characteristics of recent Cessna models approved for spins.

150F through 150L - A150K through A150L

Entries at an aft c.g. will be positive from a power off unaccelerated stall. At more forward c.g. locations, a slightly higher deceleration rate may be necessary.

The incipient phase rotation will be rapid and the nose will progress to an average 60° to 70° nose down attitude in the vicinity of two turns.

At aft c.g. loadings at 2½ to 3 turns as the airplane enters the steady phase, there may be evident some change in character of the spin. The nose attitude may become less steep and rise to approximately 45° to 50° below the horizon. In addition some change in sideslip will be felt and rotation rates will change some. As the c.g. is moved forward this tendency to change character will disappear and spiral tendencies may appear.

Recoveries during the entry and incipient phases will vary from 1/4 to 1/2 turn typically at aft c.g. loadings to practically instantaneous at forward c.g. loadings. Recoveries from extended spins will vary from in excess of a full turn at aft c.g. to 1/2 turn typically at forward c.g. locations.

150M - A150M

Spin characteristics for this model are similar to those of the earlier models except as follows. Entries at forward c.g. loadings will be more difficult to accomplish without more rapid deceleration.

The incipient phase will be almost the same as for the older models but the character change upon entering the stable phase will be subdued but still evident at aft c.g. loadings. The nose attitude change may not be evident at all, although some variation in rotation rate and sideslip may be noted.

Recoveries will be similar to those of the earlier models from all phases although a slight reduction in recovery turns (1/8 to 1/4) may be evident.

172H through 172L (1971)
Utility Category Only

Entries at an aft c.g. (utility aft) will be positive. At forward c.g. locations, more rapid deceleration or some power will be necessary to obtain an entry.

The airplane will pass rapidly through the incipient phase into the steady phase with little change to note.

Recoveries in the entry and incipient phases will be up to 1/8 of a turn at aft c.g. locations to almost instantaneous at forward c.g.'s. The steady phase recoveries will take up to 1/2 turn at aft c.g. and to about 1/8 turn at forward c.g. locations.

172L (1972) through 172M (Utility Category Only)

Entries at all utility loadings will be difficult to obtain unless some power and a slight amount of aileron toward the desired spin direction are applied.

Throughout the incipient phase, spiral tendencies will be evident and the airplane will usually spiral out of the spin by 2-1/2 to 3-1/2 turns even at aft c.g. loadings (utility aft).

There is no real steady phase with this model. Recoveries initiated at any point in the spin at any loading will result in practically instantaneous recoveries.

177 through 177B (Utility Category Only)

Entries are positive although some added deceleration or power may be necessary at forward loadings.

In incipient phase, nose attitude may cycle beyond vertical during the first 2 turns.

In the steady phase spiralling tendencies will be evident especially at forward loadings. Nose attitude will be in the area of 60° nose down. Recoveries during the entry and incipient phases will take no more than 1/4 turn and during the steady phase up to 3/4 turn regardless of loading.

For the purpose of training in spins and spin recoveries, a one or two turn spin will normally provide all that is necessary. All of the characteristic motions and control inputs required will have been experienced. Longer spins, while acceptable as a maneuver in appropriately certified airplanes, provide little additional insight to a student in the area of spin recovery since the prime reason for conducting a spin is to learn how to avoid an inadvertent entry in the first place and then how to recover if one should develop.

APPENDIX E

It is recommended that, where feasible, entries be accomplished at high enough altitude that recoveries are completed 4000 feet or more above gr level. In any case, entries should be planned so that recoveries are co well above the minimum 1500 feet above ground level required by FAR 91.7

Another reason for using high altitudes for practicing spins is that a gr field of view is provided which will assist in maintaining pilot orientat However, if disorientation does occur and precludes a visual determinatio of the direction of rotation, the symbolic airplane of the turn coordinato or the needle of the turn and bank indicator (not the ball) may be referred to for this information.

Finally, a pilot planning to spin a new model for the first time or after a long absence from this type of maneuver should first fly with a qualified instructor pilot who can point out key points in the spin and recovery proc for this particular type of airplane. The weight and balance should be che carefully to assure that the spins will be conducted at an approved loading. As previously stated, plenty of altitude should be maintained at all times. Owner's manual procedures for the spin and spin recovery should be rigorousl followed for the optimum and most repeatable characteristics.

Understanding of the information provided in this bulletin and adherence to the recommendations will assure each pilot the utmost safety of his flight.

# # # #

CAUTION

Certain makes of Emergency Locator Transmitters utilize Litium batteries. If these batteries are subjected to rapid discharge such as when they become shorted, they quite quickly release a quantity of Sulfur Dioxide. If the concentration of this gas becomes high, it irritates the eyes and can virtually incapacitate a pilot.

Luckily this gas has a very "loud" odor like burning sulfur or rotten eggs and is easily detected.

At the first indication of the presence of sulfur dioxide in your aircraft ventilate the cabin to the maximum degree possible. If oxygen is available, breathing 100% oxygen will help, as will the use of well fitted smoke glasses.

Indications are that if the ELT is within the cabin area and has several cells in it, the batteries can release enough sulfur dioxide to pose a serious problem.

# # # #

SAFETY IS EVERYONE'S BUSINESS

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