SPECIAL STUDY

GENERAL AVIATION STALL/SPIN ACCIDENTS

1967-1969

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NATIONAL TRANSPORTATION SAFETY BOARD
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16. Abstract

This report contains a discussion of stall/spin accidents and related statistics, and presents a series of statistical tables containing aircraft accident analysis data relative to a selected group of 991 stall/spin accidents which occurred during the period 1967 to 1969 inclusive. The study is based on 37 small, fixed-wing, U. S. general aviation aircraft. The data tabulated include the numbers of injuries, kind of flying, phase of operation, detailed accident causes, pilot certificate, experience, etc., and a summary of significant statistical findings is presented. Selected Briefs of Accidents are included, and an evaluation is made of the relative frequency of occurrence of stall/spins involving each airplane. Other types of accidents which preceded or were associated with a stall/spin, e.g., an engine failure or malfunction, are also considered in connection with their broad and detailed causes and related factors. Some of the statistics are tabulated with respect to the complete study fleet as well as on an individual make and model basis. The report concludes with a number of recommendations intended to reduce stall/spin occurrences.

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INTRODUCTION

Stall/spin accidents[1] involving general aviation aircraft have historically accounted for more fatal and serious injuries than any other single type of accident.[2] Although improvement has been evidenced over the past several decades, these types of occurrences still remain a very serious threat to safety in general aviation. Ever-increasing public acceptance and utilization of the airplane make a significant reduction of these accidents not merely a statistical goal, but a social, political, and economic one as well. Because of the large increase in fleet size and total flight exposure anticipated during the next decade, the number of stall/spins may be expected to escalate. However, the impetus of renewed, revitalized, and reoriented accident-prevention efforts, responsive to the needs of the general aviation system as a whole, can serve to mitigate this trend significantly. Consequently, the National Transportation Safety Board emphasizes the need for initiating new and innovative efforts, including research and development by both the general aviation industry and related government agencies, aimed at reducing these types of accidents. Since the direction and scope of such efforts will depend, to a large degree, upon the nature of the accident circumstances and a consideration of detailed causes, qualifications and experience of pilots, kind of flying, phase of operation, and the degree of involvement of a particular make and model of aircraft, a comprehensive statistical review of stall/spin accidents is clearly in order.

The Safety Board maintains computerized records of all aircraft accidents that occurred during and subsequent to 1964. The availability of such a store of data provides a substantive basis for defining the statistical scope and character of stall/spin accidents in terms of the above mentioned parameters as well as in terms of the interrelationship with other types of accidents or events, e.g., weather involvement, an engine failure or malfunction type of accident followed by a stall/spin accident, etc. This statistical potential is particularly relevant to general aviation because of the large total number of such accidents involving this type of operation.[3] Accordingly, the Board's objective in compiling this statistical supplement is to identify the nature of and circumstances relating to the majority of stall/spin occurrences involving general aviation airplanes. Since the establishment of such a statistical base is imperative in the development of effective accident

[1] The term stall/spin is used collectively herein to include discrete stall accidents as well as stall/spin occurrences.

[2] Type of accident briefly describes what happened rather than why and relates to the immediate circumstances of the occurrence.

[3] The most significant types of general aviation accidents, based on the year 1964, are evaluated in the National Transportation Safety Board report "Aircraft-Design-Induced Pilot Error," PB 175 629, Washington, D.C. 20591, July 1967.

prevention remedial measures and methodology, it is believed that these data will serve to enhance significantly any subsequent efforts intended to reduce stall/spin accidents.

SUMMARY

A. A total of 1,261 stall/spin accidents were recorded during the three-year period covered by this study, 1967 through 1969. These accounted for only about 8 percent of the total number of accidents but were responsible for 997 fatalities and 464 serious injuries—about 23-1/2 percent of the total of all fatal or serious accident injuries sustained during this period.

B. Sixty and one-half percent of all stall/spin accidents reviewed were associated with *noncommercial* flying, 19 percent were associated with *instructional* flying, 14 percent were associated with *commercial* flying, and 6-1/2 percent were associated with flying of a miscellaneous kind.

C. Twenty-four percent of the stall/spin accidents occurred during *takeoff,* 36 percent occurred during *landing,* and 40 percent occurred during the *in-flight* phase. Most of accidents in this latter phase were related to "acrobatics," "buzzing," "low passes," etc.

D. The *pilot* was considered a broad cause/factor in about 97 percent of the 744 occurrences in which a stall/spin was considered to be the primary (first type) accident.

E. Significant *miscellaneous acts and conditions* associated with first type stall/spin accidents included "unwarranted low flying," "flew into blind canyon," "poorly planned approach," "alcoholic impairment of efficiency and judgment," "improperly loaded aircraft, weight, and/or c.g.," etc.

F. Two hundred and forty-seven, or about 25 percent, of the 991 stall/spin accidents reviewed were preceded by other types of occurrences (other types of accidents), including 190 engine failures or malfunctions.

G. The broad cause/factor categories assigned to the above engine failure/malfunction accidents included the *pilot* in 54 percent of the cases, the *powerplant* in 39 percent of the cases, and *personnel* in about 13 percent of the cases.

H. Significant *miscellaneous acts and conditions* relating to the engine failure/malfunction accidents included "anti-icing/deicing equipment-improper operation of/failed to use," "fuel exhaustion," "ice-carburetor," "simulated conditions," "fuel starvation," etc.

I. Application of the Chi-Square statistical method to the study fleet disclosed that eight single-engine airplanes and one twin-engine airplane had a frequency of occurrence of stall/spin accidents that was statistically "very high" (significant at the 0.1 percent level).

THE STALL/SPIN TYPE OF ACCIDENT

The lift generated by an airplane wing increases as angle of attack and airspeed are increased. For a given airplane weight and altitude, a low angle of attack is required at relatively high speeds and a high angle of attack is required at relatively low speeds. However, at very high angles, i.e. at or beyond the stalling angle, the capability of the wing to generate lift is markedly reduced because of airflow separation, and wing stall is encountered. As a result, lift is considerably reduced and drag is significantly increased.

Recovery from a stall condition is quite simple in conventional civil aircraft if sufficient altitude is available. The angle of attack must be decreased and the airspeed increased. The airspeed at which the stall occurs is the stalling speed and, according to the ICAO Manual of Aircraft Accident Investigation, is defined for unaccelerated flight as "the minimum speed in flight at which the airplane can develop a lift equal to the weight of the airplane, the lift being the aerodynamic force perpendicular to the flightpath." The altitude required for recovery

varies from one airplane to another but for the power-off configuration, several hundred feet would probably typify the recovery requirements of most light single-engine airplanes.

A stall may occur at any airspeed, depending on the load factor or "g" force that is generated, since it is a function only of the critical stalling angle of the wing. A stall that occurs at speeds higher than the minimum speed as defined above is called an accelerated stall. Accelerated stalls often occur in flight phases involving acrobatics, buzzing, aerial application, etc., where the associated maneuvers are characterized by steep pullups or steep turns. The classification of an accident as a stall type of accident is based on statements from the pilot and/or the observations of eyewitnesses, the attitude of the airplane, the conditions and circumstances of flight prior to impact, and an evaluation of the ground and wreckage evidence. The intent of this total evaluation is to corroborate flight at or beyond the stalling angle of attack.

A spin, because of the abrupt entry, rapid rate of rotation, and general disorienting effect, is considerably more violent than a stall. A spin results when a sufficient degree of rolling or yawing control input is imposed on an airplane in the stalled condition. Without a stall a spin cannot occur. Thus, an accidental spin might result from stalling an aircraft due to "failure to obtain/maintain flying speed" in conjunction with "improper operation of the flight controls." With controls fixed in the pro-spin direction, the spin rotation, once initiated, is generally self-sustaining. The control inputs and the altitude required for recovery are much more critical for spins than for stalls, and spins at relatively low altitudes, even incipient spins where the rotation has not fully developed, are generally catastrophic. The substantiation of an incipient spin, however, is often difficult or impossible since the spin motion prior to impact may not be developed sufficiently to enable an eyewitness to observe the rotation or to result in conspicuous ground/wreckage patterns. Therefore, in this report these kinds of accidents are collectively referred to as stall/spin occurrences.

STALL/SPIN STATISTICS

A. The Accident Record

During the post World War II period, 1945 through 1948, stall/spin accidents accounted for about 48 percent of all fatal general aviation accidents. For the 3-year period covered by this study, 1967 through 1969, they accounted for 22 percent of all fatal occurrences. The 1,261 stall/spin accidents recorded during this time resulted in only about 8 percent of the total number of accidents but were responsible for 997 fatalities and 464 serious injuries, about 23-1/2 percent of the total of all fatal or serious accident injuries sustained during this period.

According to one economic study[4], by 1980, the general aviation fleet will number close to a quarter of a million aircraft, more than double the size of the 1967 fleet, and will fly about 63 million hours annually, about three times the total flight hours recorded in 1967. Thus, although a substantial relative improvement in stall/spin accident statistics appears to have been evidenced in past years, the increased size and growth rate of general aviation makes further improvement imperative if this important segment of aviation is to remain a credible, viable means of transportation.

For project study purposes, stall/spin statistical data applicable to the 3-year period 1967 through 1969 have been retrieved and evaluated only for those small, fixed-wing, active aircraft models which numbered 500 or more in 1968. These data are presented in Appendix B in tabular form and involve 991 accidents and 37 different makes and models of aircraft. (Appendix A contains briefs of selected stall/spin accidents included in data.[5]) Included are tables presenting data pertinent to kind of flying, phase of operation, pilot certificate and

[4] Aerospace Industries Association, "The Magnitude and Economic Impact of General Aviation," Washington, D. C., July 1968.

[5] Briefs of accidents provide an essential description of the accident and the accident circumstances and are prepared based on the complete factual report of investigation.

flight experience, broad cause factors, detailed cause factors, injuries, etc. A complete list of tables is included in the Table of Contents.

B. Statistical Definitions

The following explanatory notes relate to the statistical information presented herein:

1. General Aviation

General aviation refers to the operations of U. S. aircraft owned and operated by persons, corporations, etc., other than those aircraft engaged in air carrier operations authorized by a Certificate of Public Convenience and Necessity, issued by the Civil Aeronautics Board.

2. Small Fixed-Wing Aircraft

Small fixed-wing aircraft are aircraft which have a certificated maximum gross takeoff weight of 12,500 pounds or less.

3. Aircraft Accident

Aircraft accident refers to an occurrence incident to flight in which, "as a result of the operation of an aircraft, any person (occupant or nonoccupant) receives fatal or serious injury or any aircraft received substantial damage." Definition of "substantial damage" according to Section 430.2 of the Board's regulations, effective January 1, 1968, is as follows:

(1) Except as provided in subparagraph (2) of this paragraph, substantial damage means damage or structural failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

(2) Engine failure, damage limited to an engine, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for the purpose of this part.

4. Injury Index

Injury index refers to the highest degree of personal injury sustained as a result of the accident.

5. Type of Accident

Type of accident relates to the immediate circumstances of the occurrence. Many accidents involve a series of circumstances and, therefore, require a second type to be listed to describe the sequence of events more fully. The stall/spin type of accident together with examples of other types of accidents referenced herein in connection with the stall/spin accident are as follows:

a. *Stall/Spin/Spiral/Mush*

Accidents in which the aircraft stalls, spins, or mushes into the ground or water. Does not include stalls resulting in a hard landing. In those cases, hard landing will be coded as type of accident.

b. *Ground-Water Loop-Swerve*

Loss of directional control or sudden swerve while taxiing, taking off, or landing.

c. *Wheels-Up Landing*

Landing gear not lowered and locked prior to contact with the ground. Excludes inadvertent retraction on ground. Excludes collapses due to failure or malfunction of the gear assembly and/or retracting mechanism. Includes intentional retraction or wheels-up landing.

d. *Hard Landing*

Stalling onto or flying into runway or other intended landing area.

e. *Overshoot*

Landing too fast or too far down the runway or other intended landing area, resulting in: (1) running off the end of the landing area (including collisions which may result); (2) ground-looping, nosing-down, or overturning off runway or intended landing area; (3) landing beyond the intended landing area. Collisions with object as a result of overshoot may be coded as a secondary (secondary type) accident.

f. *Undershoot*

Landing or making contact with ground or object short of the runway or other intended landing area. On VFR approaches, any contact or landing short of the runway or intended landing area while on final will be coded as undershoot. On IFR approaches, an undershoot will occur only after the field or intended landing area is in sight. Stalls, collisions, etc., while on final approach will be coded as secondary type.

g. *Engine Failure/Malfunction*

Occurrences of engine failure or malfunction. For accident data, used *only* in combination with another type of accident unless serious or fatal injury and/or structural damage results from flying parts. Includes engine stoppage or power interruption or power loss for any reason.

h. *Propeller/Rotor Failure*

Instances in which failure of a rotor blade, propeller blade, hub, or related part occurs. Includes separation, overspeeding, etc. When propeller failure results from engine seizure (not intentional freezing), crankshaft failure, etc., engine failure will be coded as type of accident.

i. *Collided With*

Collision with wires, poles, trees, residence, other buildings, fence, fencepost, etc.

j. *Turbulence*

Includes vortex turbulence.

6. Phase of Operation

The phase of operation relates to the particular segment of the flight or operation during which the circumstances of the accident occur.

7. Kind of Flying

Kind of flying refers to the purpose for which the aircraft is being operated at the time of the accident. There are four broad categories of kind of flying.

a. *Instructional Flying*

Flying accomplished in supervised training under the direction of an accredited instructor.

b. *Noncommercial Flying*

Use of an aircraft for pleasure, personal transportation, private business, corporate/executive operations, and other operations in which there is no direct monetary fee charged. These categories of noncommercial flying are defined as follows:

(1) *Pleasure*

Flying by individuals in their own or rented aircraft for pleasure or personal transportation not in furtherance of their occupation or company business.

(2) *Business*

The use of aircraft by pilots not receiving direct salary or compensation for piloting, in connection with their occupation or in the furtherance of a private business.

(3) *Corporate/Executive Operations*

The use of owned or leased aircraft, operated by a corporation or business firm for the transportation of personnel or cargo in furtherance of the corporation's or firm's business and flown by professional pilots receiving a direct salary or compensation for piloting.

c. *Commercial Flying*

All general aviation flying normally conducted for direct financial return, except instructional flying. Includes air taxi operations, aerial application, fire control, aerial mapping or photography, aerial advertising, power/pipeline patrol, and fish spotting.

d. *Miscellaneous Flying*

Includes other kinds of flying not listed under the other three broad categories. In some instances, the criterion of direct financial return may or may not be present.

8. Type of Weather Conditions

Type of weather condition (VFR/IFR) is determined in accordance with the minima prescribed in Part 91 of the Federal Aviation Regulations. These minima pertain to ceiling and visibility, in conjunction with type of airspace, at the accident site. Type of weather condition

is based on surface weather as determined from officially recognized sources. Weather conditions encountered in flight are not necessarily representative of the classification VFR/IFR as listed under type of weather conditions.

9. Causes and Related Factors

In determining the probable cause of an accident, all facts, conditions, and circumstances are considered. For statistical purposes, where two or more causes exist in an accident, each is recorded and no attempt is made to establish a primary cause. Therefore, in the cause and related factor tables, the figures shown in the columns dealing with cause will exceed the total number of accidents. The term "factor" is used, in general, to reflect those elements of an accident which further explain or supplement the probable cause(s). This provision was incorporated to increase the flexibility of the coding system and to provide a means for collecting essential items of information which could not be readily categorized elsewhere in the system.

An example of the application and assignment of a cause and a related factor is as follows: An airplane was flown into weather conditions which resulted in a loss of control and an uncontrolled collision with the ground. The *probable cause* in this accident might be: "pilot - continued VFR flight into adverse weather conditions," and the *related factor,* "weather - rain; low ceiling."

C. Aircraft Make and Model Accidents and Exposure

Thirty of the 37 aircraft selected for study were single-engine types. These were involved in 914 or about 92 percent of all the stall/spin accidents considered. The seven twin-engine airplanes accounted for 77 or about 8 percent of the accidents. A summary of the aircraft and the number of stall/spin accidents involving each follows:

AIRCRAFT	STALL/SPIN ACCIDENTS
Aero Commander 500/600 Series	7
Aeronca 11 Series	16
Aeronca 7 Series	76
Beech D-18/E-18/G-18	9
Beech 35/35-33 Series	33
Beech 95/95-55 Series	18
Beech A23 Series	17
Boeing 75 Series	35
Cessna 120/140	26
Cessna 150 Series	140
Cessna 170 Series	20
Cessna 172 Series	59
Cessna 175 Series	5
Cessna 180 Series	9
Cessna 182 Series	17
Cessna 210 Series	1
Cessna 310 Series	9
Cessna 206 Series	3
Cessna 336/337 Series	4

AIRCRAFT	STALL/SPIN ACCIDENTS
Cessna 177	18
Forney/415 Series	13
Luscombe 8 Series	27
Mooney M-20 Series	35
Navion Series	5
Piper J3/PA-11 Series	81
Piper PA-12 Series	11
Piper PA-18 Series	82
Piper PA-22 Series	27
Piper PA-23 Series	12
Piper PA-24 Series	12
Piper PA-25 Series	36
Piper PA-28 Series	49
Piper PA-30 Series	18
Piper PA-32 Series	8
Taylorcraft B Series	27
Globe GC-1 Series	8
Stinson 108 Series	18

The involvement of each make and model in those kinds of flying in which most stall/spins occur was summarized based on FAA's "primary use of aircraft reports." The data for the 3-year study period are as follows:

AIRCRAFT	BUSINESS TRANSPORTATION AND PERSONAL FLYING (HOURS)	AERIAL APPLICATION (HOURS)	INSTRUCTION (HOURS)
Aero Commander	477,904	–	12,981
Aeronca 11 Series	126,321	145	6,796
Aeronca 7 Series	733,642	30,432	376,794
Beech D-18/E-18/G-18 Series	400,258	–	12,099
Beech 35/35-33 Series	2,851,161	2,008	51,390
Beech 95/95-55 Series	890,831	–	18,818
Beech A23 Series	368,408	813	497,725
Boeing 75 Series	30,355	844,358	9,218
Cessna 120/140 Series	747,782	8,850	83,313
Cessna 150 Series	1,681,747	20,728	8,778,648
Cessna 170 Series	697,963	1,285	14,603
Cessna 172 Series	3,304,842	5,664	2,368,932
Cessna 175 Series	390,212	891	14,066
Cessna 180 Series	649,290	15,108	7,696
Cessna 182 Series	2,543,555	5,459	240,198
Cessna 210 Series	726,371	103	14,115
Cessna 310 Series	883,799	–	33,170
Cessna 206 Series	353,657	4,983	10,978
Cessna 336/337 Series	309,792	–	8,293
Cessna 177 Series	150,153	570	195,432
Forney/415 Series	304,928	463	10,378
Luscombe 8 Series	365,444	1,710	17,434
Mooney M-20 Series	1,696,922	828	123,281
Navion Series	327,705	–	5,166
Piper J3/PA-11 Series	472,646	68,880	167,981
Piper PA-12 Series	234,614	2,010	25,940
Piper PA-18 Series	372,097	355,788	69,846
Piper PA-22 Series	1,374,155	4,374	510,239
Piper PA-23 Series	1,153,356	–	203,994
Piper PA-24 Series	1,320,796	545	124,782
Piper PA-25 Series	17,062	1,142,010	10,400
Piper PA-28 Series	2,594,970	8,882	4,499,572
Piper PA-30 Series	588,180	–	55,914
Piper PA-32 Series	458,218	248	53,349
Taylorcraft B Series	278,088	175	25,672
Globe GC-1 Series	108,558	115	1,769
Stinson 108 Series	343,958	502	3,609
TOTAL	25,625,620	2,527,927	18,319,522

In order to enhance the statistical correlation of stall/spin accident circumstances with particular aircraft, some of the tabular data are presented on a make-and-model basis. Categories involved include "kind of flying," "phase of operation," "pilot certificate," "first type of accident" preceding the stall/spin, "total pilot time," and "pilot time in type." These data are presented in Appendix B in Tables 3 and 4, 7 and 8, 9, 11, 24, and 25, respectively.

D. Statistical Significance of Accident Data

While the above tabulation of stall/spin accidents is useful in defining the relative status of each make and model with respect to the *overall* stall/spin problem, it does not necessarily serve as a meaningful comparison of the individual accident records. Since no account is taken of an airplane's total exposure or flight hours, there is no way of ascertaining the significance of its involvement in 10, 100, or 500 accidents. In order to do so requires some normalized basis for comparison. The information, therefore, was assessed in terms of frequency in order to establish the statistical significance of the data, i.e., was the frequency of stall/spin accidents involving each make and model higher or lower than expected. The Chi-Square statistical method, a test frequently used by researchers in determining data significance, was chosen for this purpose. Application of the test herein is based on the methodology proposed by Acheson J. Duncan in the paper, "Report on the Differential Accident Performance of Single-Engine Non-Air Carriers, 1949-1951." Basically, this methodology involves the measurement of differences between observed numbers of accidents and expected numbers of accidents. These calculations result in numerical criteria which are then compared with appropriate values of the Chi-Square distribution from a prepared statistical summary as shown in Figure 1. The computations are made using the Chi-Square formula:

$$\chi^2 = \frac{(F_o - F_e)^2}{F_e}$$

Where:

χ^2 = discrepancy between observed and expected frequencies

F_o = observed stall/spin frequency

F_e = expected stall/spin frequency

For a particular set of conditions (s), the expected frequency is

$$F_e = \left(\frac{\text{Total Study Fleet Stall/Spins}}{\text{Total Study Fleet Flight Time}}\right)_s X \left(\text{Individual Airplane Flight Time}\right)_s$$

In order to make comparisons between aircraft as meaningful as possible, the Chi-Square statistical method was applied to single-engine aircraft and twin-engine aircraft grouped according to kind of flying, i.e., *instructional, noncommercial,* and *commercial.* This type of grouping was employed in order to normalize, to the extent possible, some of the operational variables and to otherwise provide a consistent basis for comparison. The Chi-Square test was based on the total stall/spin accident distribution of the study fleet itself (including second type stall/spin accidents) and on each airplane's relative exposure or total flight-hours recorded in each of the several kinds of flying during the 3-year study period.

Calculations were made for single-engine aircraft groupings involved in *noncommercial* pleasure, practice, and business flying and in *commercial* aerial application and associated crop control activity.

Application of the test to single-engine aircraft in *instructional* flying inferred the existence of relatively high stall/spin frequencies in a number of cases, but the small sample sizes (exposure) of the individual aircraft involved generally precluded drawing any conclusions as to the significance of the data in this grouping.

Calculations were also performed for twin-engine aircraft involved in *noncommercial* pleasure, practice, and business flying and in *instructional* flying.

	PERCENTILE VALUE						
	.900	.950	.975	.990	.995	.999	.9995
DEGREES OF FREEDOM 1	2.71	3.84	5.02	6.63	7.88	10.8	12.1
2	4.61	5.99	7.38	9.21	10.6	13.8	15.2
3	6.25	7.81	9.35	11.3	12.8	16.3	17.7
4	7.78	9.49	11.1	13.3	14.9	18.5	20.0
5	9.24	11.1	12.8	15.1	16.7	20.5	22.1

Figure 1. Statistical summary of selected Chi-Square distributions.

The objective in applying the Chi-Square statistical method was to determine whether differences in frequency of stall/spin accidents between aircraft were statistically significant or were due merely to chance. In order to make this determination, statistical significance levels of 5 percent and 0.1 percent were arbitrarily chosen as cutoff points. Frequencies which did not differ from the mean stall/spin frequency at the 5 percent level of significance were considered "average;" those that differed at a significance level between 5 percent and 0.1 percent were classified as "high" or "low" (depending upon the sign of the difference between observed and expected accident numbers); and those differing beyond the 0.1 percent level were classified as "very high" or "very low". The 0.1 percent level was chosen rather than the 1 percent level customarily used in these kinds of analyses in order to lend considerably more conservatism to the "very high" or "very low" classification, i.e., the probability is only one in a thousand that a frequency classified as such stems purely from chance.

The following computations typify detailed application of the test to the study fleet.

For the *noncommercial* pleasure, practice, and business kind of flying involving only single-engine aircraft:

$$F_e = \left(\frac{\text{Total Single-Engine Stall/Spins}}{\text{Total Single-Engine Flight Time}}\right) \times \left(\begin{array}{c}\text{Individual Airplane}\\ \text{Flight Time}\end{array}\right)$$

$$= \left(\frac{551}{25{,}625{,}620}\right) \times \left(\begin{array}{c}\text{Individual Airplane}\\ \text{Flight Time}\end{array}\right)$$

For the Aeronca 7 airplane:

$$F_e = \frac{551}{25{,}625{,}620} \times 733{,}642 = 15.8$$

For this airplane, F_o, from the table "Kind of Flying by Make and Model," is 55 and

$$\chi^2 = \frac{(55.0 - 15.8)^2}{15.8} = 97.25$$

Since this value exceeds 10.8, the value of Chi-Square at the 0.999 percentile level (0.1 percent significance level), and the sign of the difference is positive, a rating of "very high" is assigned.

For the Mooney M-20 airplane:

$$F_e = \frac{551}{25{,}625{,}620} \times 1{,}696{,}922 = 36.5$$

$F_o = 27$

$$\chi^2 = \frac{(27 - 36.5)^2}{36.5} = 2.49$$

Since this value does not exceed 3.84, the Chi-Square value at the 0.95 percentile level (5 percent significance level), a rating of "average" is assigned, i.e., the frequency is not considered significant.

For the Piper PA-24 airplane:

$$F_e = \frac{551}{25{,}625{,}620} \times 1{,}320{,}796 = 28.5$$

$$F_o = 11$$

$$\chi^2 = \frac{(11.0 - 28.5)^2}{28.5} = 10.73$$

Since this value is between the value of Chi-Square at the 0.95 percentile level and the value at the 0.999 percentile level, and the sign of the difference is negative, a rating of "low" is assigned.

The results of applying this method to the study fleet are presented below. Although all aircraft were tested within each applicable kind-of-flying group, as previously mentioned, results are shown only in cases where statistical significance was evidenced. Thus, aircraft *not shown* within a given grouping either had a stall/spin frequency classified as "average" or, as happened in a few instances, had an inadequate number of total flight hours within the grouping to warrant conclusions.

AIRCRAFT	GROUPING (KIND OF FLYING)	STALL/SPIN FREQUENCY
Stinson 108 Series	*Noncommercial* pleasure, practice, and business	High
Aeronca 11 Series	"	Very high
Aeronca 7 Series	"	Very high
Cessna 150 Series	"	Very high
Cessna 177 Series	"	Very high
Luscombe 8 Series	"	Very high
Piper J3/PA-11 Series	"	Very high
Piper PA-18 Series	"	Very high
Taylorcraft B Series	"	Very high
Cessna 172 Series	"	Low
Cessna 180 Series	"	Low
Cessna 206 Series	"	Low
Piper PA-24 Series	"	Low
Beech 35/35-33 Series	"	Very low
Cessna 182 Series	"	Very low
Cessna 210 Series	"	Very low
Piper PA-28 Series	"	Very low
Piper J3/PA-11 Series	*Commercial* aerial application and associated crop control activity	Very high
Piper PA-18 Series	"	Very high
Beech 95/95-55 Series	*Noncommercial* pleasure, practice, and business	High
Piper PA-23 Series	*Instructional* dual, solo, check, training	Low
Piper PA-30 Series	"	Very high

A statistical evaluation of stall/spin/spiral/mush type accidents in an earlier NTSB special study[6] yielded results which are in general agreement with the above. The correlation appears particularly significant in cases where very high frequencies of occurrence are involved. For example, excluding the Cessna 177, which was not previously studied, all but one of the single-engine airplanes assigned a very high frequency of occurrence in this report were similarly evaluated in the previous study (using the same statistical significance levels).

The reader is cautioned against misinterpreting the above results as an evaluation of the relative safety of these airplanes or as a reflection of their individual stall or spin characteristics. This kind of reasoning is likely to be totally fallacious and such inferences are neither suggested nor intended. The objective here is merely to identify airplanes which appear to merit further study in connection with all of the elements potentially contributory to the stall/spin, including pilot judgment and proficiency, aerodynamic characteristics, effectiveness of installed stall warning equipment, phase of flight relationships, etc. The unique usefulness of the Chi-Square method is in defining "what" is significant in terms of relative frequency of occurrence rather than "why" it is significant.

E. Pilot Certificate/Weather Conditions/Lighting Conditions

The pilots involved in the 991 stall/spins, according to certificate, included 166 students, 425 private pilots, 203 commercial pilots, 163 commercial flight instructors and 34 others. Nine hundred and fifty-six of the accidents occurred during VFR weather conditions, 29 during IFR conditions, 5 in conditions unknown or not reported, and 1 in conditions below minimums. Eight hundred and ninety-two of the accidents occurred during daylight, 54 at night, 40 at dusk, 4 at dawn, and 1 in unknown or unreported lighting conditions.

F. Kind of Flying

Sixty and one-half percent of all the stall/spin accidents studied were associated with *noncommercial* flying, primarily related to pleasure, practice, and business flights. Nineteen percent were associated with *instructional* dual, solo, and training flights. Fourteen percent were associated with *commercial* flying, principally in connection with aerial application and associated crop-control activities, and the remaining 6-1/2 percent involved flights of a miscellaneous kind, e.g., test, demonstration, hunting, etc.

G. Phase of Operation

Two hundred and thirty-eight or 24 percent of the stall/spin accidents occurred during the *takeoff* phase of flight, all but one of these occurring during the initial climb. Three hundred and ninety-five or 40 percent occurred during the *in-flight* phase but only 70 of these, or 7 percent of the study group, could be accounted for in the specific phases described as "climb to cruise," "normal cruise," and "descending." The other 325 *in-flight* accidents, in all except four cases, were associated with "acrobatics," "buzzing," "low passes," flight phases relating to agricultural operations, and a flight phase described as "other" (includes operations such as coyote hunting, search and rescue, cattle roundup, and unknown phases). The remaining 358 stall/spin accidents, or 36 percent of the study group, occurred during the *landing* phase of flight, with most related specifically to "traffic pattern-circling," "final approach," and "go-around."

Fatal stall/spins numbered 73 in the *takeoff* phase, 107 in the *landing* phase, and 235 in the *in-flight* phase. The ratio of fatal stall/spin occurrences to the total number of stall/spin occurrences within a given phase of flight was

[6]National Transportation Safety Board, "Aircraft-Design-Induced Pilot Error," PB 175 629, Washington, D.C. 20591, July 1967.

approximately the same in both *takeoff* and landing (about 30 percent). In the *in-flight* phase, however, this ratio was about twice as great (about 60 percent).

H. Stall/Spin Accident Sequence

In 744 of the above-studied accidents, the stall/spin was cited as a *first accident type*. The remaining 247 stall/spins were classified as *second accident types,* i.e., they were preceded by other occurrences, including 190 engine failure/malfunctions,[7] 25 overshoots, 10 undershoots, 8 groundloops, 9 hard landings, and 5 other miscellaneous accident types. Approximately 43 percent of the engine failure/malfunctions occurred during the takeoff phase of flight, almost all of these during the initial climb; 43 percent occurred during various in-flight phases; and 14 percent during various landing phases.

I. Broad and Detailed Causes and Factors

The *pilot* was considered a broad cause/factor in about 97 percent of the first type stall/spin accidents and is cited most frequently in connection with "failed to obtain/maintain flying speed." The latter was recorded as a detailed cause/factor in 667 of these cases. Numerous other significant but less frequently related detailed cause/factors involving the pilot included "attempted operation beyond experience/ability level," "diverted attention from operation of aircraft," "continued VFR flight into adverse weather conditions," "inadequate preflight preparation and/or planning," "improper operation of flight controls," "improper in-flight decisions or planning," "exercised poor judgment," "inadequate supervision of flight," "physical impairment," and "misused or failed to use flaps." Another rather significant broad cause/factor was *weather,* which was related to about 16 percent of these first type stall/spins. The details were associated with cause/factors such as "low ceilings," "fog," "icing conditions," "unfavorable wind conditions," "downdrafts," "updrafts," "high temperature," "high density altitude," etc. The broad cause/factor *miscellaneous* was associated with about 4 percent of the cases and included detailed cause/factors such as "evasive maneuver to avoid collision," and "unqualified person operated aircraft."

Certain other *miscellaneous acts and conditions* associated with the aforementioned accidents are also considered significant. These include "unwarranted low flying" (in 106 instances), "poorly planned approach," "flew into blind canyon," "alcoholic impairment of efficiency and judgment," and "improperly loaded aircraft-weight and/or c.g."

The *pilot* was considered to be a broad cause/factor in about 54 percent of the 190 engine failure/malfunction type accidents preceding stall/spins. The detailed cause/factors tabulated most frequently were "improper operation of powerplant and powerplant controls," "inadequate preflight preparation and/or planning," and "mismanagement of fuel." Other broad cause/factor categories included the *powerplant,* cited in about 39 percent of the cases, with "powerplant failure for undetermined reasons" being detailed in about half of all such instances; *personnel,* cited in about 13 percent of the cases, primarily in connection with "inadequate maintenance and inspection; "weather in about 8 percent of the cases, with "conditions conducive to carburetor/induction system icing" being the most frequently tabulated detail; and *miscellaneous* in about 5 percent of the cases. The *miscellaneous acts and conditions* most frequently tabulated in connection with these engine failure/malfunction type accidents were "anti-icing/deicing equipment - improper operation of/failed to use," "fuel exhaustion," "ice-carburetor," "simulated conditions," and "fuel starvation."

[7] The significance of engine failure or malfunction and its relationship to all types of accidents is detailed in the National Transportation Safety Board special report (to be published) "A Study of Engine Failure/Malfunction Accidents, U.S. General Aviation, 1965 - 1969."

The broad cause/factors associated with the remaining types of accidents preceding stall/spins, i.e., overshoot, undershoot, groundloop, etc., are related primarily to the *pilot* and *weather*. The broad and detailed cause/factors relating to overshoot and undershoot occurrences are shown in Tables 16, 17, 18, and 19 (See Appendix B).

PILOT INVOLVEMENT SUMMARY

As suggested by a review of airman examinations conducted by the Federal Aviation Administration some years ago, the stall/spin problem appears partially related to a lack of knowledge and awareness of factors affecting a stall. It is also evident, however, based on the correlation of stall/spin accidents with "phase of flight," that the majority of stall/spins occur under conditions which distract the pilot and substantially divide his total attention between performance and control of the airplane and external references, operational contingencies, etc. Sixty percent of the stall/spins studied, for example, occurred during takeoff and landing, and 33 percent during in-flight acrobatics, buzzing, low passes, etc.

In connection with airplane performance, it should be noted that many of these stall/spins were precipitated by an engine failure or malfunction caused by mismanagement of fuel, improper operation of powerplant and powerplant controls, and inadequate preflight preparation and/or planning. All the detailed cause/factors associated with those engine failures or malfunctions which were subsequently followed by a stall/spin are contained in Table 15.

The pilot's attentiveness to airplane performance in terms of monitoring and controlling airspeed and responding to stall warning is often compromised by contingencies and critical circumstances which develop as a direct result of his own actions, e.g., unwarranted low flying, misuse of flaps, poorly planned approach, and inadequate preflight preparation and/or planning. These factors, as well as those relating to the above-mentioned occurrences of engine failure/malfunction, relate generally to pilot competence, proficiency, education, and judgment.

Some specific examples of pilot-involved factors, circumstances, and conditions which, based on a review of selected accidents, are related directly or indirectly to the stall/spin occurrence include:

- unwarranted low flying
- fuel exhaustion due to inadequate preflight preparation and/or planning
- fuel starvation due to mispositioning of fuel selector
- alcoholic impairment of efficiency and judgment
- poorly planned approach
- lack of familiarity with aircraft
- continuing VFR flight into adverse weather conditions
- diverted attention from operation of aircraft
- water in fuel
- premature lift-off
- flight into blind canyon
- improperly loaded aircraft-weight and/or c.g.
- inadequate soft- or short-field technique
- attempting takeoff from unimproved or inadequate fields
- attempting takeoff or go-around with wing flaps improperly extended
- inadequate landing go-around technique
- inadequate crosswind takeoff or landing technique
- abortive attempts to clear obstacles
- poor judgment and/or technique in simulated forced landings
- general lack of proficiency in takeoff or landing during windy, turbulent conditions

The general significance of a number of the above circumstances is reflected in the summary of selected stall/spin accident briefs in Appendix A.

TECHNOLOGY AND TRAINING

The fundamental criteria used in connection with most stall training maneuvers and procedures are contained in the Federal Aviation Administration's Advisory Circular 61-21, "Flight Training Handbook." Included therein is a discussion of the operational aspects and appropriate methods of instruction relative to slow flight and stalls as well as to stalls occurring during critical flight phases such as takeoff and departure, approach and landing, and accelerated maneuvers. This information relates directly to the specific stall maneuvers required during pilot certification flight tests.

Pilots must understand and appreciate numerous factors affecting the airplane stall in order to avoid an accident. These factors include angle of attack, airspeed, load factor, airplane weight, configuration and center of gravity, altitude, frost or ice, and turbulence.

One or more of these factors can generally be related to any stall/spin accident, either directly or indirectly. The importance of a knowledge and understanding of these fundamentals is stressed in a related FAA exam-o-gram[8] entitled "Factors Affecting the Stall Speed." This is attached as Appendix C.

Despite the fact that all pilots receive training in stalls and are tested for proficiency in stall recognition and recovery, stall/spin accidents continue to occur with alarming regularity. In this connection, however, it must be remembered that there is a marked contrast between a student's reaction to stalls practiced in the training environment and to those which occur in other flight phases under more critical conditions such as an engine failure. This is particularly true during landing or takeoff, when the elements of surprise, very low altitude, problem recognition, etc., all call for a high degree of proficiency if an accident involving serious injury is to be avoided. Stall training, for obvious safety reasons, is conducted at higher altitudes where most of the pilot's conscious attention is directed toward performance of the stall itself and little or no sense of urgency exists. There is ample opportunity for him to detect the incipient stall characteristics, coordinate and control the performance of the airplane, and make an almost immediate recovery at the appropriate time. Although the intent of this training is to develop an automatic reaction to avoid the stall, the accident record mutely evidences the fact that additional training and education is needed in respect to situational judgments and techniques in various takeoff and landing environments.

Although most aircraft currently being manufactured are characteristically capable of spinning, there is no current certification requirement for pilot applicants, except for those applying for the flight instructor rating, to demonstrate or to have demonstrated that they possess any practical proficiency relative to spins. Such a requirement was deleted from pilot certification criteria in accordance with CAR Amendment 20-3, adopted June 15, 1949, which stated in part:

> "This amendment eliminates spins from the pilot certification requirements and, in lieu thereof, provides for dual flight instruction in the prevention of and recovery from power-on and power-off stalls entered from all normally anticipated flight attitudes. It is believed that the deletion of the spin requirement and the placing of greater emphasis upon the prevention of and recovery from stalls will result in greater air safety in two ways: (a) it will emphasize recognition of and recovery from stalls which, on the basis of available accident statistics, has proved to be the most dangerous maneuver to pilots; and (b) elimination of the required spin maneuver will act as an incentive for manufacturers to build, and operators of schools to use, spin-resistant or spin-proof aircraft."

A comparison of statistics over the years would appear to indicate that emphasizing the

[8] An information service provided by FAA to individuals interested in Airman Written Examinations.

recognition of stalls has had a significant effect in reducing their relative numbers. For the 4-year period preceding the amendment, 1945 through 1948, for example, stall/spin accidents, on the average, accounted for about 48 percent of all fatal accidents. For the 4-year period, 1965 through 1968, they accounted for about 27 percent of all fatal accidents.

On the other hand, the evolution of spin-resistant or spin-proof aircraft has simply not been borne out. On the contrary, the trend toward modern-day, high-performance aircraft has resulted in spin characteristics considerably less favorable than those associated with predecessor aircraft. As the new generation of aircraft developed, compliance with the older, more stringent spin-recovery requirements became increasingly difficult and type certification spin tests for airplanes certificated in the normal category were, for all practical purposes, subsequently eliminated. An excerpt from FAA Advisory Circular 23-1, "Type Certification Spin Test Procedures," for example, states the following:

> "A basic concept of type certification flight testing is to explore an envelope of the airplane's characteristics which is greater in all areas than the intended operational envelope. This is to assure that, during normal operations, the operational pilot will not encounter any airplane characteristic that has not been explored by an experienced test pilot. With regard to the spinning requirements in CAR 3, type certification testing requires recovery capability from a one-turn spin while operating limitations prohibit intentional spins. This one-turn margin of safety' is designed to provide adequate controllability when recovery from a stall is delayed.
>
> "The spin requirements for normal category airplanes have changed over the years from six turns with a free control recovery to the present one-turn spin with a normal control movement recovery. Originally, and during the changes, there has never been any reference to the manner in which the spin entry should be conducted. The preamble of Amendment 3-7, dated May 3, 1962, states in part, 'These [one-turn spin] tests are considered to be an investigation of the airplane's characteristics in a delayed stall, rather than true spin tests.' This statement is significant and recognizes that CAR 3.124(a) does not require investigation of the controllability in a true spinning condition for a normal category airplane. Essentially, the test is a check of the controllability in a delayed recovery from a stall. Intentional and inadvertent, normal and accelerated stalls should be considered."

The above turnabout in projected design trends, coupled with deletion of the spin training requirement, results in a situation in which aircraft characteristically capable of spinning are being flown by pilots with no training or experience in spins or spin recovery procedures. The emphasis placed on the recognition and awareness of stalls in training as a spin preventative has unquestionable merit. Nonetheless, a significant number of stalls and spins do, in fact, occur regularly. During the 3-year study period alone, for example, a total of 237 distinct spin accidents were recorded, 179 of them fatal. It would appear, therefore, that stall training alone, regardless of how rigorous, leaves something to be desired since such a complete dependence on avoidance of the stall leaves the results or the outcome of inadvertent spin entries highly problematical.

Stall warning, including natural aerodynamic buffeting, control softening, etc., as well as the warning provided by mechanical devices, is important. In order to be effective, the warning must provide a positive means of alerting the pilot and eliciting an appropriate response from him. Stall warning devices installed in present-day aircraft, however, leave much to be desired. Lights are almost totally ineffective since most stall accidents occur under VFR conditions in circumstances in which the pilot's visual attention is, for the most part, required outside the cockpit. The effectiveness of a horn warning decreases substantially whenever the pilot is preoccupied with operational contingencies. A number of pilots involved in stall accidents, for

example, stated that they didn't hear the horn or that they didn't remember hearing it.

In terms of eliciting effective pilot response, a tactile stall warning device such as a stickshaker would appear to be generally superior. In comparative simulator tests conducted by the FAA[9] of aural stall warners (continuous and interrupted horn signals) and the tactile device (stickshaker), it was found that with respect to alerting the pilot, the stickshaker was 99 percent effective, the interrupted horn 84 percent effective, and the continuous horn only 64 percent effective. The primary advantage of the stickshaker is that, in acting upon the pilot directly, it provides the stall warning automatically.

Improved stall warning, of course, can resolve only part of a more complex problem inextricably related to both the man and the machine. Directed research and development, improvement, and innovation with respect to design as well as to pilot's training and educational curricula are necessary if the stall/spin enigma is to be adequately resolved. In the case of the machine, for instance, consideration might be given to the applicability of certain STOL[10] concepts, to modification kits intended to improve handling characteristics, to fundamental design changes for improving stall/spin characteristics, and to those general requirements necessary to ensure that performance of present-day aircraft reflect the application of design standards, and criteria consistent with today's technology.

With respect to the pilot, emphatic training measures are necessary in connection with all the fundamentals of airplane performance pertinent to the takeoff and landing, particularly as related to operational situations which may easily precipitate a stall, e.g., premature lift-off, inadequate short- or soft-field techniques, misuse of flaps, etc. The prevention of engine failure or malfunction as a result of a pilot's own actions, together with the recommended procedures to be followed in the event of an engine failure, should be stressed. Special effort should be made to further educate pilots regarding the applicability and significance of current Federal regulations relating to careless or reckless operations, buzzing, low passes, etc., and the inherent dangers in such operations. Finally, in view of the trends which have been evidenced in airplane design during the past two decades, an evaluation should be made of the feasibility of requiring at least minimal spin training of all pilot applicants.

RECOMMENDATIONS

The realization of further significant reductions in the relative numbers of stall/spin accidents will require the coordinated efforts of the general aviation community as a whole. The National Transportation Safety Board recommends that the Federal Aviation Administration, in addition to direct participation in all related programs, subsequently serve to organize, direct, and integrate such efforts toward unified objectives.

On March 23, 1972, the Federal Aviation Administration issued Notice of Proposed Rule Making No. 72-9, "Certification, Pilots and Flight Instructors," in order to revise and upgrade Part 61 of the Federal Aviation Regulations (FAR) dealing with this subject. In this NPRM, it is pointed out that although Part 61 has been amended over the years, no basic changes to pilot training and certification standards have been made since these were initially introduced in 1938. The NPRM also references the general consensus which exists regarding the need for such changes, in order to make these regulations compatible with the relatively complex operation of modern-day aircraft.

In view of the potential of enhanced pilot training for reducing stall/spin accidents, the following recommendations, where applicable,

[9] Experimentation and Evaluation of Improved Stall Warning Equipment, Report No. NA-69-35, December 1969, Federal Aviation Administration, National Aviation Facilities Experimental Center, Atlantic City, New Jersey, 08405.

[10] Short takeoff and landing.

should be considered in context with the above proposed rulemaking. The National Transportation Safety Board specifically recommends that:

1. The Federal Aviation Administration issue an Advanced Notice of Proposed Rule Making to explore the potential of reducing stall/spin accidents through innovation in ground and flight training curricula.
2. The Federal Aviation Administration, together with the National Aeronautics and Space Administration, conduct further study, including operational flight tests, of the relative effectiveness between the current, most widely utilized stall warning devices (horns, lights, etc.) and the so-called improved stall warning equipment, e.g., angle-of-attack indicators, stick-shakers, etc., as found in some of the more sophisticated general aviation aircraft.
3. The Federal Aviation Administration, the Aircraft Owners and Pilots Association, the National Pilots Association, the National Association of Flight Instructors, the Flight Safety Foundation, and the National Business Aircraft Association, through an individually appropriate medium (Advisory Circular, personal contact, magazine, etc.), specifically advise pilots to guard against the occurrence of a stall/spin accident subsequent to an engine failure or malfunction. Special emphasis should be given to the potential occurrence of the latter as a result of "improper operation of powerplant or powerplant controls," "inadequate preflight preparation and/or planning," "mismanagement of fuel," and other causes characteristically attributed to the pilot. Maintenance personnel should also be advised of the history of stall/spin accidents precipitated by engine failure or malfunction due to "inadequate maintenance and inspection."
4. The Federal Aviation Administration issue a Notice of Proposed Rule Making in connection with minimum safe altitudes in FAR Part 91.79 (c) which, except in the case of operations involving fish spotting, aerial mapping/photography, pipeline patrol, etc., would increase minimum safe altitudes over "open water or sparsely populated areas" to 500 feet, the same as that permitted over other noncongested areas.
5. The Federal Aviation Administration conduct further statistical review, technical evaluation, and operational testing of those aircraft which, based on application of the **Chi-Square** test according to kind of flying, exhibited a "very high" stall/spin frequency of occurrence.
6. The Federal Aviation Administration together with the National Aeronautics and Space Administration conduct an operational study of takeoff and landing safety, based on actual stall/spin case histories, to evaluate the situational judgments and techniques of typical general aviation pilots in these phases of flight. The project would model or synthesize circumstances or contingencies which directly or indirectly often result in a stall/spin, including engine failure/malfunction, go-around, short- or soft-field takeoffs, etc.
7. The Federal Aviation Administration and the National Aerial Applicators Association initiate additional study and research in connection with aerial application and associated crop-control activities. The objective would be to reduce stall/spin hazards unique to this kind of flying through enhanced operational techniques, innovative airplane design and improved stall-warning equipment.
8. The Federal Aviation Administration, the General Aviation Manufacturers Association, and the National Aeronautics and Space Administration conduct a joint study to determine the potential and feasibility for reducing stall/spin accidents through enhanced airplane design consistent with current technology. Specific consideration, for example, might be given to using applicable STOL technology, improved

stall warning equipment, modification kits aimed at improving the handling characteristics of present aircraft, direct lift systems, etc.

9. The Federal Aviation Administration evaluate the feasibility of requiring at least minimal spin training of all pilot applicants.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

APPENDIX A

SELECTED BRIEFS OF ACCIDENTS

SELECTED BRIEFS OF ACCIDENTS

INVOLVING STALL / SPIN

U. S. GENERAL AVIATION

1967 - 1969

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
2-0623	8/10/67 TIME - 1015	ROLLINSVILLE,COLO	PIPER PA-28 N6324R DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 3 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 41, 163 TOTAL HOURS, 160 IN TYPE, NOT INSTRUMENT RATED.
	TYPE OF ACCIDENT STALL			PHASE OF OPERATION IN FLIGHT NORMAL CRUISE		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED MISCELLANEOUS ACTS,CONDITIONS - FLEW INTO BLIND CANYON PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G. REMARKS- ACFT ABOVE MAXIMUM GROSS WT.					
2-0858	9/13/67 TIME - 1320	POESTENKILL,NY	PIPER PA-28 N7406R DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 52, 17 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - POESTENKILL TYPE OF ACCIDENT STALL			PHASE OF OPERATION LANDING GO-AROUND		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED PILOT IN COMMAND - DELAYED IN INITIATING GO-AROUND					

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4684	12/10/67 TIME - 2130	TRUCKEE,CALIF	MOONEY M21 N74567 DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 2	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 24, 280 TOTAL HOURS, 80 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - TRUCKEE
TYPE OF ACCIDENT
STALL

PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
WEATHER - FOG
WEATHER BRIEFING - BRIEFED BY WEATHER BUREAU PERSONNEL, IN PERSON
WEATHER FORECAST - FORECAST SUBSTANTIALLY CORRECT

SKY CONDITION
UNKNOWN/NOT REPORTED
VISIBILITY AT ACCIDENT SITE
1/2 MILE OR LESS
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
FOG
TYPE OF WEATHER CONDITIONS
IFR
CEILING AT ACCIDENT SITE
UNLIMITED
PRECIPITATION AT ACCIDENT SITE
NONE
TEMPERATURE-F
20
TYPE OF FLIGHT PLAN
NONE
REMARKS- VISIBILITY 1/2-1/4 MILE. AIRCRAFT COVERED WITH HEAVY FROST.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0119	1/28/68 TIME - 1402	AMARILLO,TEX	MOONEY M20C N7700M DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 3	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 37, 148 TOTAL HOURS, 35 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - TRADEWIND
TYPE OF ACCIDENT
STALL

PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

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

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0551	2/18/68 TIME - 1440	CRESTWOOD,ILL	BEECH 35 N4532V DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 43, 201 TOTAL HOURS, 14 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - HOWELL
TYPE OF ACCIDENT
STALL SPIN

PHASE OF OPERATION
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - POORLY PLANNED APPROACH
FIRE AFTER IMPACT
REMARKS- PLT EXECUTED STEEP NOSE HIGH TURN SPACING SELF BEHIND LANDING ACFT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2746	8/11/68 TIME - 1830	AMESBURY,MASS	AERONCA 7AC N1700E DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 1	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 50, 200 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

TYPE OF ACCIDENT
STALL

PHASE OF OPERATION
IN FLIGHT BUZZING

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
REMARKS- CRASHED IN LAKE.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2901	6/30/68 TIME - 1347	NR.GREENFIELD,CALIF	BEECH B35 N5177C DAMAGE-DESTROYED	CR- 1 0 0 PX- 2 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 41, 163 TOTAL HOURS, 113 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - METTLER STRIP
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL

PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE
LANDING TRAFFIC PATTERN-CIRCLING

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISMANAGEMENT OF FUEL
MISCELLANEOUS ACTS,CONDITIONS - FUEL SELECTOR POSITIONED BETWEEN TANKS
MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- TURNING ON TO FINAL.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3076	9/7/68 TIME - 1700	PELZER,SC	AERONCA 7AC N83460 DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 45, 50 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

TYPE OF ACCIDENT
STALL SPIN

PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE

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

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3098	9/21/68 TIME - 1745	COLLINSTON,LA	CHAMPION 7FC N7532E DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	COMMERCIAL OTHER	COMMERCIAL, AGE 26, 427 TOTAL HOURS, 92 IN TYPE, NOT INSTRUMENT RATED.

TYPE OF ACCIDENT
STALL

PHASE OF OPERATION
IN FLIGHT LOW PASS

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
REMARKS- PLT HIRED TO CHASE BLACKBIRDS FROM RICE FIELD.CRASHED DURING STEEP TURN AT LOW ALT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3160	10/2/68 TIME - 1730	SCHLATER,MISS	AERONCA 7AC N82181 DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 1	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 38, 483 TOTAL HOURS, 301 IN TYPE, NOT INSTRUMENT RATED.
	TYPE OF ACCIDENT STALL			PHASE OF OPERATION IN FLIGHT OTHER		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING REMARKS- STALLED FROM LOW TURN CHASING BIRDS					
3-3175	9/28/68 TIME - 1200	LAWTON,MICH	AERONCA 7AC N83128 DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 42, 22 TOTAL HOURS, 5 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - MARKS TYPE OF ACCIDENT STALL			PHASE OF OPERATION TAKEOFF INITIAL CLIMB		
	PROBABLE CAUSE(S) PILOT IN COMMAND - PREMATURE LIFT-OFF					
3-3207	9/11/68 TIME - 1500	WHITE MARSH,MD	MOONEY M20E N79852 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL BUSINESS	PRIVATE, AGE 31, 700 TOTAL HOURS, 350 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - BALTMORE AIRPARK TYPE OF ACCIDENT ENGINE FAILURE OR MALFUNCTION STALL SPIN			PHASE OF OPERATION TAKEOFF INITIAL CLIMB TAKEOFF INITIAL CLIMB		
	PROBABLE CAUSE(S) POWERPLANT - MISCELLANEOUS POWERPLANT FAILURE FOR UNDETERMINED REASONS PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE EMERGENCY CIRCUMSTANCES - FORCED LANDING ON AIRPORT/SEAPLANE BASE/HELIPT. FIRE AFTER IMPACT					
3-3305	7/14/68 TIME - 1345	SANTA SUSANA,CAL	MOONEY M20C N3420X DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 2 1	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 37, 257 TOTAL HOURS, 34 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - SANTA SUSANA TYPE OF ACCIDENT STALL			PHASE OF OPERATION IN FLIGHT NORMAL CRUISE		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED REMARKS- IN TIGHT TURN.					

SELECTED BRIEFS OF ACCIDENTS (CONT'D)

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3417	7/4/68 TIME - 1800	CASCADIA,OREG	MOONEY M20F N9527M DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 1 1	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 61, 4400 TOTAL HOURS, 262 IN TYPE, NOT INSTRUMENT RATED.
	TYPE OF ACCIDENT STALL				PHASE OF OPERATION IN FLIGHT OTHER	
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED PILOT IN COMMAND - IMPROPER IN-FLIGHT DECISIONS OR PLANNING FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - FLEW INTO BLIND CANYON REMARKS- PLT UNABLE TO CLEAR TOPS OF RIDGES.					
3-3451	8/2/68 TIME - 0640	BERNARD,ID	MOONEY M20F N6340Q DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 1 2	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 45, 1200 TOTAL HOURS, 150 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - BERNARD LDG FLD TYPE OF ACCIDENT STALL				PHASE OF OPERATION IN FLIGHT OTHER	
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED PILOT IN COMMAND - IMPROPER OPERATION OF FLIGHT CONTROLS REMARKS- WHEN ACFT BEGAN TO BUFFET AND SETTLE DURG TURN PLT HELD ELEVATOR CTL FULL BACK UNTIL GRND IMPACT.					
3-3544	10/6/68 TIME - 1730	EDGERTON,WYO	BEECH A35 N8770A DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 47, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - RANCH STRIP TYPE OF ACCIDENT STALL				PHASE OF OPERATION TAKEOFF INITIAL CLIMB	
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED FIRE AFTER IMPACT REMARKS- STALLED FROM STEEP CLIMBING TURN.					

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3802	7/12/68 TIME - 0910	THE DALLES,OREG	CESSNA 150 N22872 DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 0	MISCELLANEOUS FERRY	COMMERCIAL, FL.INSTR., AGE 27, 256 TOTAL HOURS, 158 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - THE DALLES
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL

PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - FUEL EXHAUSTION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND

3-3901	8/21/68 TIME - 1339	HILLSBORO,OREG	BEECH B35 N5241C DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL BUSINESS	PRIVATE, AGE 47, 193 TOTAL HOURS, 7 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - HILLSBORO
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL

PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISMANAGEMENT OF FUEL
MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- FAILED TO SWITCH TANKS.

3-3914	9/19/68 TIME - 1655	PACOIMA,CALIF	CESSNA 150H N6482S DAMAGE-DESTROYED	CR- 0 2 0 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 25, 302 TOTAL HOURS, 225 IN TYPE, NOT INSTRUMENT RATED.

TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL

PHASE OF OPERATION
LANDING TRAFFIC PATTERN-CIRCLING
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - SPONTANEOUS-IMPROPER ACTION
PILOT IN COMMAND - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - SIMULATED CONDITIONS
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- INSTRUCTOR SHUT OFF FUEL FOR PRACTICE FORCED LNDG,WAS UNABLE TO RESTART ENG.STALLED FROM LOW TURN.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4532	3/29/68 TIME - 1336	SAN JOSE,CALIF	BEECH 35 N8709A DAMAGE-DESTROYED	CR- 1 0 0 PX- 2 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 27, 1787 TOTAL HOURS, 1 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - REID-HILLVIEW

TYPE OF ACCIDENT
- ENGINE FAILURE OR MALFUNCTION
- STALL

PHASE OF OPERATION
- TAKEOFF INITIAL CLIMB
- TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
- PILOT IN COMMAND - MISMANAGEMENT OF FUEL
- MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
- PILOT IN COMMAND - LACK OF FAMILIARITY WITH AIRCRAFT
- PILOT IN COMMAND - FAILED TO ABORT TAKEOFF
- PILOT IN COMMAND - IMPROPER IN-FLIGHT DECISIONS OR PLANNING
- PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED

FIRE AFTER IMPACT

REMARKS- STALLED DURING STEEP TURN BACK TO ARPT.OPEN FIELDS WERE AVAILABLE FOR ACFT TO MAKE LANDING OFF APT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-4602	8/29/68 TIME - 2445	CASTLE ROCK,COLO	BEECH G35 N1020A DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 43, 86 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

TYPE OF ACCIDENT
- STALL SPIN

PHASE OF OPERATION
- IN FLIGHT NORMAL CRUISE

PROBABLE CAUSE(S)
- PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
- PILOT IN COMMAND - CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS
- PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED

FACTOR(S)
- WEATHER - LOW CEILING

WEATHER BRIEFING - NO BRIEFING RECEIVED

WEATHER FORECAST - FORECAST SUBSTANTIALLY CORRECT

SKY CONDITION
- UNKNOWN/NOT REPORTED

CEILING AT ACCIDENT SITE
- 600

VISIBILITY AT ACCIDENT SITE
- 5 OR OVER

PRECIPITATION AT ACCIDENT SITE
- DRIZZLE

OBSTRUCTIONS TO VISION AT ACCIDENT SITE
- NONE

WIND DIRECTION-DEGREES
- 360

WIND VELOCITY-KNOTS
- 20

TYPE OF WEATHER CONDITIONS
- VFR

TYPE OF FLIGHT PLAN
- NONE

FIRE AFTER IMPACT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
6-0033	11/24/68 TIME - 0900	NAVAJOA,MEX	BEECH D35 N3700N DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 2	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 43, 700 TOTAL HOURS, 200 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - NAVAJOA

TYPE OF ACCIDENT
- STALL SPIN

PHASE OF OPERATION
- LANDING TRAFFIC PATTERN-CIRCLING

REMARKS- NVESTIGATION UNDER JURISDICTION OF THE GOVERNME NT OF MEXICO.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0002	2/2/69 TIME - 1600	SCOTT,ARK	PIPER PA-28 N1726J DAMAGE-DESTROYED	CR- 1 0 0 PX- 3 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 24, 200 TOTAL HOURS, 50 IN TYPE, NOT INSTRUMENT RATED.
	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 - EXERCISED POOR JUDGMENT MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G. FIRE AFTER IMPACT REMARKS- APRXLY 10 LBS OVER MAX GROSS WT.					
3-0041	1/10/69 TIME - 1736	FREDONIA,ARIZ	BEECH 35 N2725V DAMAGE-DESTROYED	CR- 1 0 0 PX- 3 0 0	NONCOMMERCIAL BUSINESS	PRIVATE, AGE 57, 912 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - FREDONIA TYPE OF ACCIDENT STALL SPIN				PHASE OF OPERATION IN FLIGHT NORMAL CRUISE	
	PROBABLE CAUSE(S) MISCELLANEOUS - UNDETERMINED REMARKS- ACFT WAS OBSERVED TO ENTER A L SPIN FROM ST/LEVEL FLT WITH NO ATTEMPT AT RECOVERY BEFORE CRASH.					
3-0064	1/24/69 TIME - 1000	FARMERVILLE,LA	CESSNA 150J N50468 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 19, 36 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - FARMERVILLE TYPE OF ACCIDENT STALL				PHASE OF OPERATION UNKNOWN/NOT REPORTED	
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED REMARKS- PLT BELIEVED TO HAVE CRASHED ON GO AROUND. NO WITNESSES. FLAPS WERE UP.					
3-0156	1/15/69 TIME - 1715	MILPITAS,CALIF	CESSNA 150G N8264F DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 19, 451 TOTAL HOURS, 99 IN TYPE, NOT INSTRUMENT RATED.
	TYPE OF ACCIDENT STALL SPIN				PHASE OF OPERATION UNKNOWN/NOT REPORTED	
	PROBABLE CAUSE(S) MISCELLANEOUS - UNDETERMINED FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER MISSING AIRCRAFT - LATER RECOVERED REMARKS- RECOVERY DATE-1/17/69.ACFT WAS OBSERVED TO SPIN INTO RESERVOIR.					

SELECTED BRIEFS OF ACCIDENTS (CONT'D)

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-0564	4/3/69 TIME - 1610	MARYSVILLE,OHIO	PIPER PA-28 N150SU DAMAGE-SUBSTANTIAL	CR- 0 0 2 PX- 0 0 0	INSTRUCTIONAL DUAL	COMMERCIAL, FL.INSTR., AGE 21, 321 TOTAL HOURS, 230 IN TYPE, INSTRUMENT RATED.
	TYPE OF ACCIDENT ENGINE FAILURE OR MALFUNCTION STALL			PHASE OF OPERATION LANDING GO-AROUND LANDING FINAL APPROACH		
	PROBABLE CAUSE(S) MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION DUAL STUDENT - MISMANAGEMENT OF FUEL PILOT IN COMMAND - INADEQUATE SUPERVISION OF FLIGHT PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND REMARKS- STUDENT TURNED FUEL SELECTOR VALVE TO OFF POSITION.					
3-0597	3/1/69 TIME - 1800	PRESHO,S DAK	AERONCA 7GCB N9825Y DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 1 0	MISCELLANEOUS HUNTING	COMMERCIAL, AGE 33, 1272 TOTAL HOURS, 163 IN TYPE, NOT INSTRUMENT RATED.
	TYPE OF ACCIDENT STALL SPIN			PHASE OF OPERATION IN FLIGHT OTHER		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED REMARKS- COYOTE HUNTING.					
3-0717	2/25/69 TIME - 0837	SANDSTON,VA	MOONEY M20G N3593X DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	NONCOMMERCIAL BUSINESS	PRIVATE, AGE 26, 69 TOTAL HOURS, 26 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - BYRD FIELD TYPE OF ACCIDENT STALL			PHASE OF OPERATION TAKEOFF INITIAL CLIMB		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED					
3-1077	4/18/69 TIME - 1714	COLORADO SPS,COLO	MOONEY M20F N9697M DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 36, 572 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.
	NAME OF AIRPORT - FALCON TYPE OF ACCIDENT STALL			PHASE OF OPERATION IN FLIGHT OTHER		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED					

SELECTED BRIEFS OF ACCIDENTS (CONT'D)

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-1612	6/20/69 TIME - 0110	NR.MCGRATH,ALAS	AERONCA 7AC N84699 DAMAGE-SUBSTANTIAL	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 26, 125 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - YANKEE CREEK TYPE OF ACCIDENT STALL SPIN			PHASE OF OPERATION IN FLIGHT NORMAL CRUISE		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED PILOT IN COMMAND - PHYSICAL IMPAIRMENT MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT REMARKS- PLT BLOOD ALCOHOL LEVEL 135 MG PCT.					
3-2359	7/29/69 TIME - 0735	SANTA SUSANA,CAL	CHAMPION 7GCBC N1689G DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 27, 320 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - SANTA SUSANA TYPE OF ACCIDENT STALL			PHASE OF OPERATION LANDING TRAFFIC PATTERN-CIRCLING		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED					
3-2490	9/28/69 TIME - 1745	MORGAN CITY,MISS	AERONCA 7AC N85570 DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 21, 201 TOTAL HOURS, 198 IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - REX KELLY FARM DEPARTURE POINT MORGAN CITY,MISS TYPE OF ACCIDENT STALL SPIN		INTENDED DESTINATION MORGAN CITY,MISS	PHASE OF OPERATION IN FLIGHT NORMAL CRUISE		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED REMARKS- STALLED FROM LOW R TURN.					

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2536	7/26/69 TIME - 0453	SACRAMENTO,CALIF	PIPER PA-28R N7580J DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 3 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 53, 300 TOTAL HOURS, 43 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - NATOMAS
DEPARTURE POINT: SACRAMENTO,CALIF
INTENDED DESTINATION: BEND,OREG
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB
IN FLIGHT OTHER

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- FUEL SELECTOR IN OFF POSITION. ACFT OVER MAX GROSS WT ABOUT 129 LBS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2538	8/19/69 TIME - 1830	WHITMIRE,SC	MOONEY M20E N79353 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	STUDENT, AGE 38, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - OXNER
DEPARTURE POINT: WHITMIRE,SC
INTENDED DESTINATION: WHITMIRE,SC
LAST ENROUTE STOP
UNKNOWN/NOT REPORTED
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - WATER IN FUEL
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2580	7/29/69 TIME - 1915	VALLY CENTER,KANS	CHAMPION 7KCAB N6354N DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 27, 2065 TOTAL HOURS, 64 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - ROBINSON
DEPARTURE POINT
VALLY CENTER,KANS
INTENDED DESTINATION
WICHITA,KANS
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT OTHER

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 - DOWNWIND
FIRE AFTER IMPACT
REMARKS- ACFT OBSVD IN STEEPLY BANKED CLIMBING L TURN.

3-2616	4/7/69 TIME - 1515	ALBION,WASH	BEECH 35 N2875V DAMAGE-DESTROYED	CR- 1 0 0 PX- 2 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 41, 9500 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - EGGERS
DEPARTURE POINT
COLFAX,WASH
INTENDED DESTINATION
UNKNOWN/NOT REPORTED
TYPE OF ACCIDENT
STALL SPIN
PHASE OF OPERATION
IN FLIGHT ACROBATICS

PROBABLE CAUSE(S)
PILOT IN COMMAND - PHYSICAL IMPAIRMENT
MISCELLANEOUS ACTS,CONDITIONS - ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- INTNTL LOW ALT SPIN. PLT BLOOD ALCOHOL LEVEL 385 MG PCT. STRUCK POWER LINES.

3-2739	11/19/69 TIME - 1640	MEGARGEL,TEX	CESSNA 150 N61167 DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	COMMERCIAL POWER/PIPELINE	COMMERCIAL, AGE 31, 970 TOTAL HOURS, 960 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT
IOWA PARK,TEX
INTENDED DESTINATION
IOWA PARK,TEX
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT OTHER

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FIRE AFTER IMPACT
REMARKS- ACFT OBSERVED IN A 180 DEG TURN TO LINE UP WITH PIPELINE.

FILE
3-2740
3-2743
3-2943

SELECTED BRIEFS OF ACCIDENTS (CONT'D)

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-2740	11/2/69 TIME - 1330	EATON RAPIDS,MICH	CESSNA A150K N8335M DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	MISCELLANEOUS DEMONSTRATION	COMMERCIAL, FL.INSTR., AGE 38, 8698 TOTAL HOURS, 14 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - STEVENS
DEPARTURE POINT
EATON RAPIDS,MICH
INTENDED DESTINATION
EATON RAPIDS,MICH
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 - EXERCISED POOR JUDGMENT
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- PLT DIED 11/4/69.

3-2743	11/8/69 TIME - 1423	BARRON,WIS	MOONEY M20E N1293X DAMAGE-DESTROYED	CR- 1 0 0 PX- 1 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 49, 550 TOTAL HOURS, 400 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - BARRON
DEPARTURE POINT
BARRON,WIS
INTENDED DESTINATION
BARRON,WIS
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
PILOT IN COMMAND - DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
REMARKS- PLT DISTRACTED TRYING TO LATCH GR HANDLE UP.

3-2943	11/7/69 TIME - 1832	CARD,MICH	PIPER PA-28 N4477J DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 29, 29 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - CARD
DEPARTURE POINT
CARD,MICH
INTENDED DESTINATION
CARD,MICH
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
IN FLIGHT OTHER

PROBABLE CAUSE(S)
PILOT IN COMMAND - SPATIAL DISORIENTATION
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PERSONNEL - FLIGHT INSTRUCTOR INADEQUATE SUPERVISION OF FLIGHT
FIRE AFTER IMPACT
REMARKS- ACFT WAS OBSERVED TO MAKE ABRUPT PULL-UP FROM A LOW ALT.PLT TOTAL NITE FLT TIME .9 HRS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3014	6/28/69 TIME - 1920	DACULA,GA	AERONCA 7AC N2655E DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	NO CERTIFICATE, AGE 40, 500 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.
	DEPARTURE POINT DACULA,GA TYPE OF ACCIDENT STALL	INTENDED DESTINATION DACULA,GA		PHASE OF OPERATION IN FLIGHT BUZZING		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING					
3-3133	8/10/69 TIME - 1600	NR.SCAPPOOSE,OREG	CHAMPION 7KCAB N1607G DAMAGE-DESTROYED	CR- 0 1 0 PX- 1 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 29, 1000 TOTAL HOURS, 45 IN TYPE, NOT INSTRUMENT RATED.
	DEPARTURE POINT SCAPPOOSE,OREG TYPE OF ACCIDENT STALL	INTENDED DESTINATION SCAPPOOSE,OREG		PHASE OF OPERATION IN FLIGHT ACROBATICS		
	PROBABLE CAUSE(S) PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED PILOT IN COMMAND - EXERCISED POOR JUDGMENT MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER REMARKS- PLT ENGAGED IN PERSONAL FLT AFTER FIRE PATROL. ACFT SANK IN RIVER,PX DROWNED.					
3-3368	8/11/69 TIME - 1405	OXFORD,NY	AERONCA 7AC N3454E DAMAGE-SUBSTANTIAL	CR- 0 1 0 PX- 0 1 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 42, 1700 TOTAL HOURS, UNK/NR IN TYPE, NOT INSTRUMENT RATED.
	NAME OF AIRPORT - HILLTOP DEPARTURE POINT OXFORD,NY TYPE OF ACCIDENT ENGINE FAILURE OR MALFUNCTION STALL	INTENDED DESTINATION OXFORD,NY		PHASE OF OPERATION TAKEOFF INITIAL CLIMB TAKEOFF INITIAL CLIMB		
	PROBABLE CAUSE(S) PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING MISCELLANEOUS ACTS,CONDITIONS - FUEL EXHAUSTION PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND					

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3393	10/20/69 TIME - 1130	BEMIDJI,MINN	CHAMPION 7KCAB N5227X DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, FL.INSTR., AGE 56, 4260 TOTAL HOURS, 63 IN TYPE, NOT INSTRUMENT RATED.

DEPARTURE POINT: BEMIDJI,MINN
INTENDED DESTINATION: LOCAL
TYPE OF ACCIDENT: STALL
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 - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
MISCELLANEOUS ACTS,CONDITIONS - UNWARRANTED LOW FLYING
REMARKS- DRG ATTEMPT TO COMPLETE 2 SLOW ROLLS,ACFT OBSVD TO VEER R AND NOSE DOWN.ALT EST APRX 100-300FT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3394	10/25/69 TIME - 1600	THOMASVILLE,GA	BEECH 35 N2817V DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 2	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	PRIVATE, AGE 22, 235 TOTAL HOURS, 73 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - THOMASVILLE
DEPARTURE POINT: VALDOSTA,GA
INTENDED DESTINATION: LOCAL
TYPE OF ACCIDENT: ENGINE FAILURE OR MALFUNCTION; STALL
PHASE OF OPERATION: IN FLIGHT NORMAL CRUISE; IN FLIGHT OTHER

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
PILOT IN COMMAND - MISMANAGEMENT OF FUEL
MISCELLANEOUS ACTS,CONDITIONS - FUEL STARVATION
MISCELLANEOUS ACTS,CONDITIONS - FUEL SELECTOR POSITIONED BETWEEN TANKS
PILOT IN COMMAND - MISJUDGED DISTANCE AND ALTITUDE
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
REMARKS- DRG ATTEMPT RETURN TO ARPT ACFT STRUCK TREES APRX 1/4MILE SHORT OF FIELD.NO FUEL FOUND IN L TANK.

SELECTED BRIEFS OF ACCIDENTS (CONT'D)

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
3-3648	8/25/69 TIME - 1830	LOMBARD,ILL	PIPER PA-28 N6843W DAMAGE-SUBSTANTIAL	CR- 0 0 1 PX- 0 0 0	INSTRUCTIONAL TRAINING	STUDENT, AGE 43, 45 TOTAL HOURS, 44 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - MITCHELL
DEPARTURE POINT
LOMBARD,ILL
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
STALL
GEAR COLLAPSED
PHASE OF OPERATION
LANDING GO-AROUND
LANDING OTHER

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
PILOT IN COMMAND - MISJUDGED DISTANCE AND SPEED
PILOT IN COMMAND - DELAYED IN INITIATING GO-AROUND
FACTOR(S)
TERRAIN - HIGH OBSTRUCTIONS
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- UN CLB ABV TREES AT W END OF FIELD.

3-3762	10/13/69 TIME - 1228	SO.WEYMOUTH,MASS	PIPER PA-28 N6423W DAMAGE-DESTROYED	CR- 1 0 0 PX- 0 0 0	INSTRUCTIONAL SOLO	STUDENT, AGE 28, 32 TOTAL HOURS, ALL IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - SOUTH WEYMOUTH NS
DEPARTURE POINT
SO.WEYMOUTH,MASS
INTENDED DESTINATION
SO.WEYMOUTH,MASS
LAST ENROUTE STOP
NEW BEDFORD,MASS
TYPE OF ACCIDENT
STALL
PHASE OF OPERATION
LANDING TRAFFIC PATTERN-CIRCLING

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO OBTAIN/MAINTAIN FLYING SPEED
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - POORLY PLANNED APPROACH
FIRE AFTER IMPACT
REMARKS- DOWNWIND LEG TOO CLOSE. STALLED FROM STEEP S TURN BACK TO FINAL APCH.

6-0039	7/4/69 TIME - 1500	MULEGE,BAJA,MEX	MOONEY M20C N9112V DAMAGE-DESTROYED	CR- 0 1 0 PX- 0 0 3	NONCOMMERCIAL PLEASURE/PERSONAL TRANSP	COMMERCIAL, AGE 52, 455 TOTAL HOURS, 30 IN TYPE, NOT INSTRUMENT RATED.

NAME OF AIRPORT - MULEGE
DEPARTURE POINT
MEXICALI,MEX
INTENDED DESTINATION
MULEGE,BAJA,MEX
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
STALL
PHASE OF OPERATION
LANDING GO-AROUND
LANDING GO-AROUND
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
FIRE AFTER IMPACT
REMARKS- INVESTIGATION UNDER JURISDICTION OF GOVT OF MEXICO.

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	CORPORATION/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 B

TABLES

TABLE I

INJURIES, ACCIDENTS (SUMMARY)
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	INJURIES						
	FATAL	SERIOUS	MINOR	NONE	UNKNOWN		TOTAL
PILOT	398	185	186	222			991
COPILOT	36	7	2	4			49
DUAL STUDENT	34	6	23	21			84
CHECK PILOT							
FLIGHT ENGINEER							
NAVIGATOR							
CABIN ATTENDANT							
EXTRA CREW	2	1	1				4
PASSENGERS	320	171	128	217			836
TOTAL	790	370	340	464		ABOARD	1964
OTHER AIRCRAFT							
OTHER GROUND	4	6	6				16
GRAND TOTAL	794	376	346	464			1980

INVOLVES 991 TOTAL ACCIDENTS
INVOLVES 427 FATAL ACCIDENTS

TABLE 2

KIND OF FLYING BY INJURY INDEX
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
INSTRUCTIONAL							
DUAL	35	11	20	18	84	84	8.48
SOLO	11	6	12	9	38	38	3.83
CHECK							
TRAINING	21	9	14	23	67	67	6.76
NONCOMMERCIAL							
PLEASURE	224	97	82	88	491	491	49.55
PRACTICE	10	4	6	5	25	25	2.52
BUSINESS	36	18	9	13	76	76	7.67
CORPORATE/EXECUTIVE	4				4	4	.40
AERIAL SURVEY			1		1	1	.10
COMPANY FLIGHT							
OTHER		2			2	2	.20
COMMERCIAL							
AERIAL APPLICATION	24	9	12	23	68	68	6.86
ASSOCIATED CROP CONTROL ACTIV	10	8	4	15	37	37	3.73
FIRE CONTROL							
ASSOCIATED FIRE CONTROL ACTIV							
AERIAL MAPPING/PHOTOGRAPHY							
AERIAL ADVERTISING		1	2	1	4	4	.40
POWER AND PIPELINE PATROL	6				6	6	.61
FISH SPOTTING			1		1	1	.10
AIR TAXI-PASSENGER OPERATIONS	9	4	2	2	17	17	1.72
AIR TAXI-CARGO OPERATIONS	1				1	1	.10
CONSTRUCTION WORK							
SCHEDULED PASSENGER SERVICE							
SCHEDULED CARGO SERVICE							
NONSCHEDULED/CHARTER REVENUE							
NONSCHEDULED/CHARTER REVENUE							
MILITARY CONTRACT-PASSENGER							
MILITARY CONTRACT-CARGO							
CONTRACT/CHARTER-CARGO-DOMEST							
CONTRACT/CHARTER-PASSENGER-DO							
CONTRACT/CHARTER-CARGO-INTERN							
CONTRACT/CHARTER-PASSENGER-IN							

TABLE 2 (CONT'D)

	FATAL	SERIOUS	MINOR	NONE			RECORDS	ACCIDENTS	PERCENT
OTHER	2	1		2			5	5	.50
UNKNOWN/NOT REPORTED									
MISCELLANEOUS									
EXPERIMENTATION									
TEST	5		4	1			10	10	1.01
DEMONSTRATION	6	3		2			11	11	1.11
FERRY	3	3	1	1			8	8	.81
SEARCH AND RESCUE	2	2		1			5	5	.50
AIR SHOW/AIR RACING	2	1	2				5	5	.50
PARACHUTE JUMP		1	1				2	2	.20
PARACHUTE JUMP IN CONNECTION									
TOWING GLIDERS	2						2	2	.20
SEEDING CLOUDS									
HUNTING	6	2		2			10	10	1.01
POLICE PATROL			1				1	1	.10
ALL OTHER PUBLIC FLYING	1						1	1	.10
OTHER	3						3	3	.30
UNKNOWN/NOT REPORTED	4		2				6	6	.61
RECORDS	427	182	176	206			991		
ACCIDENTS	427	182	176	206				991	
PERCENT	.0	43.1	18.4	17.8	20.8	.0	.0		

TABLE 3

KIND OF FLYING BY AIRCRAFT MAKE AND MODEL
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL											35	35
DUAL	1	1	4		1	2	4	1	2	19	22	22
SOLO		2	1				1			18		
CHECK											38	38
TRAINING		2	1				2		2	31		
NONCOMMERCIAL											179	179
PLEASURE	4	8	52	3	22	9	5	7	14	55	13	13
PRACTICE		1	2		1	1	1			7	22	22
BUSINESS		1	1		7	4	3		2	4	1	1
CORPORATE/EXECUTIVE						1					1	1
AERIAL SURVEY			1									
COMPANY FLIGHT												
OTHER												
COMMERCIAL											16	16
AERIAL APPLICATION			1	1				14			14	14
ASSOCIATED CROP CONTROL ACTIV			1					13				
FIRE CONTROL												
ASSOCIATED FIRE CONTROL ACTIV												
AERIAL MAPPING/PHOTOGRAPHY												
AERIAL ADVERTISING												
POWER AND PIPELINE PATROL			1							2	3	3
FISH SPOTTING												
AIR TAXI-PASSENGER OPERATIONS	2			3							5	5
AIR TAXI-CARGO OPERATIONS				1							1	1
CONSTRUCTION WORK												
SCHEDULED PASSENGER SERVICE												
SCHEDULED CARGO SERVICE												
NONSCHEDULED/CHARTER REVENUE (PASSENGER)												
NONSCHEDULED/CHARTER REVENUE (CARGO)												
MILITARY CONTRACT-PASSENGER												
MILITARY CONTRACT-CARGO												
CONTRACT/CHARTER-CARGO-DOMEST												
CONTRACT/CHARTER-PASSENGER-DO												
CONTRACT/CHARTER-CARGO-INTERN												
CONTRACT/CHARTER-PASSENGER-IN												

TABLE 3 (CONT'D)

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
OTHER			1								1	1
UNKNOWN/NOT REPORTED												
MISCELLANEOUS												
EXPERIMENTATION												
TEST			2	1			1		1		5	5
DEMONSTRATION			1						1	2	4	4
FERRY	1		2		2				1	1	7	7
SEARCH AND RESCUE												
AIR SHOW/AIR RACING									1	1	2	2
PARACHUTE JUMP												
PARACHUTE JUMP (IN CONNECTION WITH AIR SHOW)												
TOWING GLIDERS												
SEEDING CLOUDS												
HUNTING			2						1		3	3
POLICE PATROL												
ALL OTHER PUBLIC FLYING			1								1	1
OTHER			1						1		2	2
UNKNOWN/NOT REPORTED			1			1					2	2
RECORDS	7	16	76	9	33	18	17	35	26	140	377	
ACCIDENTS	7	16	76	9	33	18	17	35	26	140		377

TABLE 3 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL											
DUAL	1	2					2			5	5
SOLO		1								1	1
CHECK											
TRAINING	4	6								10	10
NONCOMMERCIAL											
PLEASURE	14	41	4	4	10		2			75	75
PRACTICE		2								2	2
BUSINESS		2	1	1	5	1	3		1	14	14
CORPORATE/EXECUTIVE											
AERIAL SURVEY											
COMPANY FLIGHT											
OTHER		1								1	1
COMMERCIAL											
AERIAL APPLICATION											
ASSOCIATED CROP CONTROL ACTIV											
FIRE CONTROL											
ASSOCIATED FIRE CONTROL ACTIV											
AERIAL MAPPING/PHOTOGRAPHY											
AERIAL ADVERTISING											
POWER AND PIPELINE PATROL									1	1	1
FISH SPOTTING											
AIR TAXI-PASSENGER OPERATIONS		1		2	1		1	1	1	7	7
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											
OTHER											
UNKNOWN/NOT R											
MISCELLANEOUS											
EXPERIMENTATI											
TEST											
DEMONSTRATION											
FERRY											
SEARCH AND RI											
AIR SHOW/AIR											
PARACHUTE JU											
PARACHUTE JU											
TOWING GLIDE											
SEEDING CLOU											
HUNTING											
POLICE PATRO											
ALL OTHER PU											
OTHER											
UNKNOWN/NOT											
RECORDS											
ACCIDENTS											

TABLE 3 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
OTHER									1	1	1
UNKNOWN/NOT REPORTED											
MISCELLANEOUS											
EXPERIMENTATION											
TEST											
DEMONSTRATION		1					2			3	3
FERRY											
SEARCH AND RESCUE	1	1								2	2
AIR SHOW/AIR RACING											
PARACHUTE JUMP			1							1	1
PARACHUTE JUMP IN CONNECTION											
TOWING GLIDERS			1							1	1
SEEDING CLOUDS											
HUNTING											
POLICE PATROL											
ALL OTHER PUBLIC FLYING											
OTHER				1						1	1
UNKNOWN/NOT REPORTED		1				1				2	2
RECORDS	20	59	5	9	17	1	9	3	4	127	
ACCIDENTS	20	59	5	9	17	1	9	3	4		127

TABLE 3 (CONT'D)

	Cessna 177	Fomey/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL											
DUAL	1	1	5	4		4		1	1	17	17
SOLO	1					2			2	5	5
CHECK											
TRAINING		1	3	2		5	1	1	3	16	16
NONCOMMERCIAL											
PLEASURE	11	9	16	18	4	42	7	29	15	151	151
PRACTICE	1					4	1	1		7	7
BUSINESS	3	1	2	9		4	1	3	6	29	29
CORPORATE/EXECUTIVE								1		1	1
AERIAL SURVEY											
COMPANY FLIGHT											
OTHER								1		1	1
COMMERCIAL											
AERIAL APPLICATION						5		25		30	30
ASSOCIATED CROP CONTROL ACTIV						4		7		11	11
FIRE CONTROL											
ASSOCIATED FIRE CONTROL ACTIV											
AERIAL MAPPING/PHOTOGRAPHY											
AERIAL ADVERTISING						1	1	1		3	3
POWER AND PIPELINE PATROL								2		2	2
FISH SPOTTING								1		1	1
AIR TAXI-PASSENGER OPERATIONS	1									1	1
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											

OTHER
UNKNOWN/NOT
MISCELLANEOU
EXPERIMENTA
TEST
DEMONSTRATI
FERRY
SEARCH AND
AIR SHOW/AI
PARACHUTE J
PARACHUTE J
TOWING GLID
SEEDING CLO
HUNTING
POLICE PATR
ALL OTHER P
OTHER
UNKNOWN/NOT

RECORDS
ACCIDENTS

TABLE 3 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
OTHER											
UNKNOWN/NOT REPORTED						2				2	2
MISCELLANEOUS											
EXPERIMENTATION											
TEST											
DEMONSTRATION						2		1		3	3
FERRY		1		1		1				3	3
SEARCH AND RESCUE				1						1	1
AIR SHOW/AIR RACING					1	1		1		3	3
PARACHUTE JUMP			1			1		1		3	3
PARACHUTE JUMP IN CONNECTION											
TOWING GLIDERS											
SEEDING CLOUDS								1		1	1
HUNTING											
POLICE PATROL						3		4		7	7
ALL OTHER PUBLIC FLYING								1		1	1
OTHER											
UNKNOWN/NOT REPORTED											
RECORDS	18	13	27	35	5	81	11	82	27	299	
ACCIDENTS	18	13	27	35	5	81	11	82	27		299

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL										27	27
DUAL	4	1	11	9		1	1			10	10
SOLO			7			2			1		
CHECK										3	3
TRAINING			3								
NONCOMMERCIAL										86	86
PLEASURE	2	9	20	6	4	24	7	14		3	3
PRACTICE			2	1						11	11
BUSINESS	4	2	1 3	1						2	2
CORPORATE/EXECUTIVE	1			1							
AERIAL SURVEY											
COMPANY FLIGHT											
OTHER											
COMMERCIAL										22	22
AERIAL APPLICATION		22								12	12
ASSOCIATED CROP CONTROL ACTIV		12									
FIRE CONTROL											
ASSOCIATED FIRE CONTROL ACTIV											
AERIAL MAPPING/PHOTOGRAPHY									1	1	1
AERIAL ADVERTISING											
POWER AND PIPELINE PATROL											
FISH SPOTTING										4	4
AIR TAXI-PASSENGER OPERATIONS	1				3						
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											

TABLE 3 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
OTHER					1					1	1
UNKNOWN/NOT REPORTED											
MISCELLANEOUS											
EXPERIMENTATION											
TEST			2							2	2
DEMONSTRATION			1							1	1
FERRY											
SEARCH AND RESCUE											
AIR SHOW/AIR RACING											
PARACHUTE JUMP									1	1	1
PARACHUTE JUMP IN CONNECTION											
TOWING GLIDERS											
SEEDING CLOUDS											
HUNTING											
POLICE PATROL											
ALL OTHER PUBLIC FLYING											
OTHER											
UNKNOWN/NOT REPORTED		1							1	2	2
RECORDS	12	12	36	49	18	8	27	8	18	188	
ACCIDENTS	12	12	36	49	18	8	27	8	18		188

TABLE 4

KIND OF FLYING BY AIRCRAFT MAKE AND MODEL
STALL OR STALL/SPIN AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL												
DUAL			3			1			1	14	19	19
SOLO		1	1				1			15	18	18
CHECK												
TRAINING		1	1						1	24	27	27
NONCOMMERCIAL												
PLEASURE	2	6	43	2	17	4	3	7	12	49	145	145
PRACTICE		1	1				1			6	9	9
BUSINESS		1	1		5	2			2	4	15	15
CORPORATE/EXECUTIVE						1					1	1
AERIAL SURVEY			1								1	1
COMPANY FLIGHT												
OTHER												
COMMERCIAL												
AERIAL APPLICATION				1				12			13	13
ASSOCIATED CROP CONTROL ACTIV			1					6			7	7
FIRE CONTROL												
ASSOCIATED FIRE CONTROL ACTIV												
AERIAL MAPPING/PHOTOGRAPHY												
AERIAL ADVERTISING												
POWER AND PIPELINE PATROL			1							2	3	3
FISH SPOTTING												
AIR TAXI-PASSENGER OPERATIONS	1			1							2	2
AIR TAXI-CARGO OPERATIONS				1							1	1
CONSTRUCTION WORK												
SCHEDULED PASSENGER SERVICE												
SCHEDULED CARGO SERVICE												
NONSCHEDULED/CHARTER REVENUE												
NONSCHEDULED/CHARTER REVENUE												
MILITARY CONTRACT-PASSENGER												
MILITARY CONTRACT-CARGO												
CONTRACT/CHARTER-CARGO-DOMEST												
CONTRACT/CHARTER-PASSENGER-DO												
CONTRACT/CHARTER-CARGO-INTERN												
CONTRACT/CHARTER-PASSENGER-IN												

TABLE 4 (CONT'D)

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
OTHER			1								1	1
UNKNOWN/NOT REPORTED												
MISCELLANEOUS												
EXPERIMENTATION												
TEST			1					1			2	2
DEMONSTRATION			1					1	2		4	4
FERRY		1	2		1						4	4
SEARCH AND RESCUE												
AIR SHOW/AIR RACING								1	1		2	2
PARACHUTE JUMP												
PARACHUTE JUMP IN CONNECTION												
TOWING GLIDERS												
SEEDING CLOUDS												
HUNTING			2					1			3	3
POLICE PATROL												
HIGHWAY TRAFFIC ADVISORY												
ALL OTHER PUBLIC FLYING			1								1	1
OTHER			1					1			2	2
UNKNOWN/NOT REPORTED			1								1	1
RECORDS	3	11	63	5	23	8	5	25	21	117	281	
ACCIDENTS	3	11	63	5	23	8	5	25	21	117		281

TABLE 4 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL											
DUAL	1	1					1			3	3
SOLO		1								1	1
CHECK											
TRAINING	3	3								6	6
NONCOMMERCIAL											
PLEASURE	10	32	1	3	7		2			55	55
PRACTICE		2								2	2
BUSINESS		2	1	1	1	1	1		1	8	8
CORPORATE/EXECUTIVE											
AERIAL SURVEY											
COMPANY FLIGHT											
OTHER		1								1	1
COMMERCIAL											
AERIAL APPLICATION											
ASSOCIATED CROP CONTROL ACTIV											
FIRE CONTROL											
ASSOCIATED FIRE CONTROL ACTIV											
AERIAL MAPPING/PHOTOGRAPHY											
AERIAL ADVERTISING											
POWER AND PIPELINE PATROL									1	1	1
FISH SPOTTING											
AIR TAXI-PASSENGER OPERATIONS				2			1	1		4	4
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											
OTHER											
UNKNOWN											
MISCELL											
EXPERIM											
TEST											
DEMONST											
FERRY											
SEARCH											
AIR SHO											
PARACHU											
PARACHU											
TOWING											
SEEDING											
HUNTING											
POLICE											
HIGHWA											
ALL OT											
OTHER											
UNKNOW											
RECORDS											
ACCIDENT											

TABLE 4 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
OTHER								1		1	1
UNKNOWN/NOT REPORTED											
MISCELLANEOUS											
EXPERIMENTATION											
TEST											
DEMONSTRATION		1					1			2	2
FERRY	1	1								2	2
SEARCH AND RESCUE											
AIR SHOW/AIR RACING			1							1	1
PARACHUTE JUMP											
PARACHUTE JUMP IN CONNECTION			1							1	1
TOWING GLIDERS											
SEEDING CLOUDS				1						1	1
HUNTING											
POLICE PATROL											
HIGHWAY TRAFFIC ADVISORY											
ALL OTHER PUBLIC FLYING											
OTHER					1					1	1
UNKNOWN/NOT REPORTED		1				1				2	2
RECORDS	15	45	2	8	9	1	6	2	3	91	
ACCIDENTS	15	45	2	8	9	1	6	2	3		91

TABLE 4 (CONT'D)

	Cessna 177	Fomey/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
TRUCTIONAL											
L	1		2	2		2		1	1	9	9
U	1					2			1	4	4
CK		1	3	2		5	1		3	15	15
AINING											
NCOMMERCIAL											
EASURE	7	7	12	13	2	31	6	27	10	115	115
ACTICE	1					4	1	1		7	7
SINESS	3		2	7		4		3	6	25	25
RPORATE/EXECUTIVE								1		1	1
RIAL SURVEY											
MPANY FLIGHT											
HER											
MMERCIAL											
ERIAL APPLICATION						5		23		28	28
SSOCIATED CROP CONTROL ACTIV						3		7		10	10
IRE CONTROL											
SSOCIATED FIRE CONTROL ACTIV											
ERIAL MAPPING/PHOTOGRAPHY						1		1		2	2
ERIAL ADVERTISING								2		2	2
OWER AND PIPELINE PATROL											
ISH SPOTTING										1	1
AIR TAXI-PASSENGER OPERATIONS	1										
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											

OTHER
UNKNOWN/NO
MISCELLANE
EXPERIMENT
TEST
DEMONSTRAT
FERRY
SEARCH AN
AIR SHOW/
PARACHUTE
PARACHUTE
TOWING GL
SEEDING C
HUNTING
POLICE PA
HIGHWAY T
ALL OTHER
OTHER
UNKNOWN/N

RECORDS
ACCIDENTS

TABLE 4 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
OTHER											
UNKNOWN/NOT REPORTED						2				2	2
MISCELLANEOUS											
EXPERIMENTATION											
TEST						1				1	1
DEMONSTRATION		1		1		1				3	3
FERRY				1						1	1
SEARCH AND RESCUE					1	1		1		3	3
AIR SHOW/AIR RACING			1					1		2	2
PARACHUTE JUMP											
PARACHUTE JUMP IN CONNECTION								1		1	1
TOWING GLIDERS											
SEEDING CLOUDS						3		4		7	7
HUNTING								1		1	1
POLICE PATROL											
HIGHWAY TRAFFIC ADVISORY											
ALL OTHER PUBLIC FLYING											
OTHER											
UNKNOWN/NOT REPORTED											
RECORDS	14	9	20	26	3	65	8	74	21	240	
ACCIDENTS	14	9	20	26	3	65	8	74	21		240

TABLE 4 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
INSTRUCTIONAL											
DUAL	2	1	5	4		1				13	13
SOLO			6			2		1		9	9
CHECK											
TRAINING			2							2	2
NONCOMMERCIAL											
PLEASURE	1	7	15	2	3	23	5	6		62	62
PRACTICE			1	1						2	2
BUSINESS	1	1	3	1						7	7
CORPORATE/EXECUTIVE	1									1	1
AERIAL SURVEY											
COMPANY FLIGHT											
OTHER											
COMMERCIAL											
AERIAL APPLICATION			19							19	19
ASSOCIATED CROP CONTROL ACTIV			9							9	9
FIRE CONTROL											
ASSOCIATED FIRE CONTROL ACTIV											
AERIAL MAPPING/PHOTOGRAPHY									1	1	1
AERIAL ADVERTISING											
POWER AND PIPELINE PATROL											
FISH SPOTTING						3				3	3
AIR TAXI-PASSENGER OPERATIONS											
AIR TAXI-CARGO OPERATIONS											
CONSTRUCTION WORK											
SCHEDULED PASSENGER SERVICE											
SCHEDULED CARGO SERVICE											
NONSCHEDULED/CHARTER REVENUE											
NONSCHEDULED/CHARTER REVENUE											
MILITARY CONTRACT-PASSENGER											
MILITARY CONTRACT-CARGO											
CONTRACT/CHARTER-CARGO-DOMEST											
CONTRACT/CHARTER-PASSENGER-DO											
CONTRACT/CHARTER-CARGO-INTERN											
CONTRACT/CHARTER-PASSENGER-IN											
OTHER											
UNKNOWN/NOT											
MISCELLANEO											
EXPERIMENTA											
TEST											
DEMONSTRATI											
FERRY											
SEARCH AND											
AIR SHOW/AI											
PARACHUTE J											
PARACHUTE											
TOWING GLI											
SEEDING CL											
HUNTING											
POLICE PAT											
HIGHWAY TR											
ALL OTHER											
OTHER											
UNKNOWN/NO											
RECORDS											
ACCIDENTS											

TABLE 4 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
OTHER											
UNKNOWN/NOT REPORTED											
MISCELLANEOUS											
EXPERIMENTATION											
TEST			1							1	1
DEMONSTRATION			1							1	1
FERRY											
SEARCH AND RESCUE											
AIR SHOW/AIR RACING											
PARACHUTE JUMP											
PARACHUTE JUMP IN CONNECTION											
TOWING GLIDERS											
SEEDING CLOUDS											
HUNTING											
POLICE PATROL											
HIGHWAY TRAFFIC ADVISORY											
ALL OTHER PUBLIC FLYING											
OTHER											
UNKNOWN/NOT REPORTED			1						1	2	2
RECORDS	5	9	30	34	8	6	26	5	9	132	
ACCIDENTS	5	9	30	34	8	6	26	5	9		132

TABLE 5

FIRST PHASE OF OPERATION BY INJURY INDEX
STALL OR STALL/SPIN AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
STATIC							
STARTING ENGINE/S							
IDLING ENGINE/S							
ENGINE RUNUP							
IDLING ROTORS							
PARKED-ENGINES NOT OPERATING							
OTHER							
TAXI							
TO TAKEOFF							
FROM LANDING							
OTHER							
GROUND TAXI TO TAKEOFF							
GROUND TAXI FROM LANDING							
GROUND TAXI, OTHER							
AERIAL TAXI TO TAKEOFF							
AERIAL TAXI TO/FROM LANDING							
AERIAL TAXI, OTHER							
TAKEOFF							
RUN	49	36	34	72			
INITIAL CLIMB							
VERTICAL							
RUNNING			1				
ABORTED							
ABORTED							
ABORTED							
OTHER							
INFLIGHT							
CLIMB TO CRUISE	6	3		2			
NORMAL CRUISE	35	6	5	1			
DESCENDING	2	2					
HOLDING							
HOVERING							
POWER-ON DESCENT							
AUTOROTATIVE DESCENT							
ACROBATICS	31	4	2	1			

TABLE 5 (CONT'D)

	FATAL	SERIOUS	MINOR	NONE			RECORDS	ACCIDENTS	PERCENT
BUZZING	16	2	3	1			22	22	2.96
UNCONTROLLED DESCENT	1		1				2	2	.27
EMERGENCY DESCENT									
LOW PASS	34	16	14	11			75	75	10.08
OTHER	63	16	6	8			93	93	12.50
EN ROUTE TO TREAT CROP	1	2					3	3	.40
EN ROUTE TO RELOADING AREA									
SURVEY FIELD/AREA	5			1			6	6	.81
STARTING SWATH RUN	1		1	2			4	4	.54
SWATH RUN	1						1	1	.13
FLAREOUT FOR SWATH RUN				1			1	1	.13
PULLUP FROM SWATH RUN	4	2	1	3			10	10	1.34
PROCEDURE TURNAROUND	16	6	8	14			44	44	5.91
CLEANUP SWATH									
MANEUVER TO AVOID OBSTRUCTION									
RETURN TO STRIP									
LANDING									
TRAFFIC PATTERN-CIRCLING	24	9	6	2			41	41	5.51
FINAL APPROACH	19	13	12	17			61	61	8.20
INITIAL APPROACH									
FINAL APPROACH			1				1	1	.13
LEVEL OFF/TOUCHDOWN									
ROLL									
ROLL-ON/RUN-ON									
POWER-ON LANDING									
POWER-OFF AUTOROTATIVE LANDIN									
GO-AROUND	16	14	25	16			71	71	9.54
MISSED APPROACH									
OTHER	2	2	1				5	5	.67
UNKNOWN/NOT REPORTED	12						12	12	1.61
RECORDS	338	133	121	152			744		
ACCIDENTS	338	133	121	152				744	
PERCENT	.0	45.4	17.9	16.3	20.4	.0	.0		

TABLE 6

SECOND PHASE OF OPERATION BY INJURY INDEX
STALL OR STALL/SPIN AS SECOND ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
STATIC							
STARTING ENGINE/S							
IDLING ENGINE/S							
ENGINE RUNUP							
IDLING ROTORS							
PARKED-ENGINES NOT OPERATING							
OTHER							
TAXI							
TO TAKE OFF							
FROM LANDING							
OTHER							
GROUND TAXI TO TAKEOFF							
GROUND TAXI FROM LANDING							
GROUND TAXI, OTHER							
AERIAL TAXI TO TAKEOFF							
AERIAL TAXI TO/FROM LANDING							
AERIAL TAXI, OTHER							
TAKEOFF							
RUN							
INITIAL CLIMB	24	8	4	10	46	46	18.62
VERTICAL							
RUNNING							
ABORTED							
ABORTED							
ABORTED							
OTHER							
IN FLIGHT							
CLIMB TO CRUISE	1		1		2	2	.81
NORMAL CRUISE	3	2			5	5	2.02
DESCENDING	1				1	1	.40
HOLDING							
HOVERING							
POWER-ON DESCENT							
AUTOROTATIVE DESCENT							
ACROBATICS			1		1	1	.40

TABLE 6 (CONT'D)

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
BUZZING							
UNCONTROLLED DESCENT	1				1	1	.40
EMERGENCY DESCENT							
LOW PASS	2				2	2	.81
OTHER	2				2	2	.81
EN ROUTE TO TREAT CROP	8	4		1	13	13	5.26
EN ROUTE TO RELOADING AREA							
SURVEY FIELD/AREA							
STARTING SWATH RUN							
SWATH RUN							
FLAREOUT FOR SWATH RUN							
PULLUP FROM SWATH RUN							
PROCEDURE TURNAROUND	1	1		1			
CLEANUP SWATH		1	2	1	3	3	1.21
MANEUVER TO AVOID OBSTRUCTION					4	4	1.62
RETURN TO STRIP							
LANDING							
TRAFFIC PATTERN-CIRCLING							
FINAL APPROACH	4		1				
INITIAL APPROACH	26	17	27	25	5	5	2.02
FINAL APPROACH					95	95	38.46
LEVEL OFF/TOUCHDOWN							
ROLL		1					
ROLL-ON/RUN-ON					1	1	.40
POWER-ON LANDING							
POWER-OFF AUTOROTATIVE LANDIN							
GO-AROUND							
MISSED APPROACH	12	11	15	15	53	53	21.46
OTHER							
UNKNOWN/NOT REPORTED	4	3	5	1	13	13	5.26
RECORDS	89	49	55	54	247		
ACCIDENTS	89	49	55	54		247	
PERCENT	.0	36.0	19.8	22.3	21.9	.0	.0

TABLE 7

FIRST PHASE OF OPERATION BY AIRCRAFT MAKE AND MODEL
STALL OR STALL/SPIN AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
STATIC												
STARTING ENGINE/S												
IDLING ENGINE/S												
ENGINE RUNUP												
IDLING ROTORS												
PARKED-ENGINES NOT OPERATING												
OTHER												
TAXI												
TO TAKEOFF												
FROM LANDING												
OTHER												
GROUND TAXI TO TAKEOFF												
GROUND TAXI FROM LANDING												
GROUND TAXI, OTHER												
AERIAL TAXI TO TAKEOFF												
AERIAL TAXI TO/FROM LANDING												
AERIAL TAXI, OTHER												
TAKEOFF												
RUN												
INITIAL CLIMB	1	4	14	2	3		2	5	8	22	61	61
VERTICAL												
RUNNING												
ABORTED												
ABORTED												
ABORTED												
OTHER												
INFLIGHT												
CLIMB TO CRUISE												
NORMAL CRUISE		1	4		3	3			1	8	20	20
DESCENDING	1										1	1
HOLDING												
HOVERING												
POWER-ON DESCENT												
AUTOROTATIVE DESCENT												
ACROBATICS			7		2			6	1	6	22	22

TABLE 7 (CONT'D)

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
BUZZING		1	5		1					3	10	10
UNCONTROLLED DESCENT										1	1	1
EMERGENCY DESCENT												
LOW PASS		2	15		1	1	1		3	19	42	42
OTHER	1		9		2	1	1		2	18	34	34
EN ROUTE TO TREAT CROP								1			1	1
EN ROUTE TO RELOADING AREA												
SURVEY FIELD/AREA								1			1	1
STARTING SWATH RUN				1				1			2	2
SWATH RUN												
FLAREOUT FOR SWATH RUN												
PULLUP FROM SWATH RUN								1			1	1
PROCEDURE TURNAROUND								9			9	9
CLEANUP SWATH												
MANEUVER TO AVOID OBSTRUCTION												
RETURN TO STRIP												
LANDING												
TRAFFIC PATTERN-CIRCLING		1	5		6	1		1	2	3	19	19
FINAL APPROACH		1	1	2	3	1				8	16	16
INITIAL APPROACH												
FINAL APPROACH												
LEVEL OFF/TOUCHDOWN												
ROLL												
ROLL-ON/RUN-ON												
POWER-ON LANDING												
POWER-OFF AUTOROTATIVE LANDIN												
GO-AROUND			1		2	1	1		3	26	34	34
MISSED APPROACH												
OTHER												
UNKNOWN/NOT REPORTED		1	2						1	3	7	7
RECORDS	3	11	63	5	23	8	5	25	21	117	281	
ACCIDENTS	3	11	63	5	23	8	5	25	21	117		281

TABLE 7 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKEOFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN										33	33
INITIAL CLIMB	9	18	2			1	2	1			
VERTICAL											
RUNNING										1	1
ABORTED		1									
ABORTED											
ABORTED											
OTHER											
INFLIGHT										2	2
CLIMB TO CRUISE		1		1						5	5
NORMAL CRUISE	2			2		1					
DESCENDING											
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS											

BUZZING
UNCONTROLL
EMERGENCY
LOW PASS
OTHER
EN ROUTE T
EN ROUTE T
SURVEY FIE
STARTING S
SWATH RUN
FLAREOUT F
PULLUP FRO
PROCEDURE
CLEANUP SW
MANEUVER T
RETURN TO
LANDING
TRAFFIC PA
FINAL APPR
INITIAL A
FINAL APPR
LEVEL OFF/
ROLL
ROLL-ON/RU
POWER-ON
POWER-OFF
GO-AROUND
MISSED AP
OTHER
UNKNOWN/N
RECORDS
ACCIDENTS

TABLE 7 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
BUZZING	1	1		1						3	3
UNCONTROLLED DESCENT											
EMERGENCY DESCENT											
LOW PASS	1	3	1	1				1		7	7
OTHER		6		1	1			1		9	9
EN ROUTE TO TREAT CROP											
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA											
STARTING SWATH RUN											
SWATH RUN											
FLAREOUT FOR SWATH RUN											
PULLUP FROM SWATH RUN											
PROCEDURE TURNAROUND											
CLEANUP SWATH											
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING				1	1		1			3	3
FINAL APPROACH	1	5	1	1		1	1			10	10
INITIAL APPROACH											
FINAL APPROACH											
LEVEL OFF/TOUCHDOWN											
ROLL											
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND	1	8		2	2		2			15	15
MISSED APPROACH											
OTHER		1			1					2	2
UNKNOWN/NOT REPORTED		1								1	1
RECORDS	15	45	2	8	9	1	6	2	3	91	
ACCIDENTS	15	45	2	8	9	1	6	2	3		91

TABLE 7 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKEOFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN											
INITIAL CLIMB	4	4	4	7	1	16	2	13	8	59	59
VERTICAL											
RUNNING											
ABORTED											
ABORTED											
ABORTED											
OTHER											
INFLIGHT											
CLIMB TO CRUISE		1	1		1	1				4	4
NORMAL CRUISE			2	2		4		2		10	10
DESCENDING			1	1						2	2
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS			3		1	5	1	2	2	14	14

TABLE 7 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
BUZZING		1	1	1	1	1	1	1		7	7
UNCONTROLLED DESCENT											
EMERGENCY DESCENT											
LOW PASS	2		2		6		8	2		20	20
OTHER	2	1	2	5	12	2	13	1		38	38
EN ROUTE TO TREAT CROP							2			2	2
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA					2		3			5	5
STARTING SWATH RUN							1			1	1
SWATH RUN							1			1	1
FLAREOUT FOR SWATH RUN					1		3			4	4
PULLUP FROM SWATH RUN					6		17			23	23
PROCEDURE TURNAROUND											
CLEANUP SWATH											
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING	1		1	4	2		2			10	10
FINAL APPROACH		2	2	3	7	1	2	6		23	23
INITIAL APPROACH											
FINAL APPROACH											
LEVEL OFF/TOUCHDOWN											
ROLL											
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND	5		1	2	2		3	1		14	14
MISSED APPROACH						1				1	1
OTHER				1			1			2	2
UNKNOWN/NOT REPORTED											
RECORDS	14	9	20	26	3	65	8	74	21	240	
ACCIDENTS	14	9	20	26	3	65	8	74	21		240

TABLE 7 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKEOFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN											
INITIAL CLIMB	1	7	8	5	1	1	9	2	4	38	38
VERTICAL											
RUNNING											
ABORTED											
ABORTED											
ABORTED											
OTHER											
INFLIGHT											
CLIMB TO CRUISE			1	1		1	2			5	5
NORMAL CRUISE				4	2	1	5			12	12
DESCENDING							1			1	1
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS				1				1		2	2

BUZZING
UNCONTRO
EMERGENC
LOW PASS
OTHER
EN ROUTE
EN ROUTE
SURVEY F
STARTING
SWATH RU
FLAREOUT
PULLUP F
PROCEDUR
CLEANUP
MANEUVER
RETURN T
LANDING
TRAFFIC
FINAL AP
INITIAL
FINAL AI
LEVEL OF
ROLL
ROLL-ON
POWER-O
POWER-O
GO-AROU
MISSED
OTHER
UNKNOWN
RECORDS
ACCIDENTS

TABLE 7 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
BUZZING			1			1				2	2
UNCONTROLLED DESCENT			1							1	1
EMERGENCY DESCENT											
LOW PASS			1		1	2	1	1		6	6
OTHER		2	2		2	4	1	1		12	12
EN ROUTE TO TREAT CROP											
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA											
STARTING SWATH RUN			2							2	2
SWATH RUN											
FLAREOUT FOR SWATH RUN											
PULLUP FROM SWATH RUN			5							5	5
PROCEDURE TURNAROUND			12							12	12
CLEANUP SWATH											
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING	1		1	4	1		1		1	9	9
FINAL APPROACH	2		1	8					1	12	12
INITIAL APPROACH											
FINAL APPROACH					1					1	1
LEVEL OFF/TOUCHDOWN											
ROLL											
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND			5	1		1			1	8	8
MISSED APPROACH											
OTHER	1		1							2	2
UNKNOWN/NOT REPORTED				2						2	2
RECORDS	5	9	30	34	8	6	26	5	9	132	
ACCIDENTS	5	9	30	34	8	6	26	5	9		132

TABLE 8

SECOND PHASE OF OPERATION BY MAKE AND MODEL
STALL OR STALL/SPIN AS SECOND ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
STATIC												
STARTING ENGINE/S												
IDLING ENGINE/S												
ENGINE RUNUP												
IDLING ROTORS												
PARKED-ENGINES NOT OPERATING												
OTHER												
TAXI												
TO TAKE OFF												
FROM LANDING												
OTHER												
GROUND TAXI TO TAKEOFF												
GROUND TAXI FROM LANDING												
GROUND TAXI, OTHER												
AERIAL TAXI TO TAKEOFF												
AERIAL TAXI TO/FROM LANDING												
AERIAL TAXI, OTHER												
TAKEOFF												
RUN											17	17
INITIAL CLIMB	1	1	2	2	1	5	2	1	1	1		
VERTICAL												
RUNNING												
ABORTED												
ABORTED												
ABORTED												
OTHER												
IN FLIGHT												
CLIMB TO CRUISE								1			1	1
NORMAL CRUISE			1			1					2	2
DESCENDING												
HOLDING												
HOVERING												
POWER-ON DESCENT												
AUTOROTATIVE DESCENT												
ACROBATICS												

TABLE 8 (CONT'D)

	Aero Comdr 500/600 Series	Aeronca 11 Series	Aeronca 7 Series	Beech D-18/E-18/G-18	Beech 35/35-33 Series	Beech 95/95-55 Series	Beech A23 Series	Boeing 75 Series	Cessna 120/140	Cessna 150 Series	RECORDS	ACCIDENTS
BUZZING												
UNCONTROLLED DESCENT												
EMERGENCY DESCENT			1								1	1
LOW PASS					1						1	1
OTHER	1			1	1	1				1	5	5
EN ROUTE TO TREAT CROP												
EN ROUTE TO RELOADING AREA												
SURVEY FIELD/AREA												
STARTING SWATH RUN												
SWATH RUN												
FLAREOUT FOR SWATH RUN												
PULLUP FROM SWATH RUN			1								1	1
PROCEDURE TURNAROUND							2				2	2
CLEANUP SWATH												
MANEUVER TO AVOID OBSTRUCTION												
RETURN TO STRIP												
LANDING												
TRAFFIC PATTERN-CIRCLING			1		2			1			4	4
FINAL APPROACH	1	3	5		5	2	6	6	2	13	43	43
INITIAL APPROACH												
FINAL APPROACH												
LEVEL OFF/TOUCHDOWN												
ROLL												
ROLL-ON/RUN-ON												
POWER-ON LANDING												
POWER-OFF AUTOROTATIVE LANDIN												
GO-AROUND	1		2	1		1	3		1	7	16	16
MISSED APPROACH		1							1	1	3	3
OTHER												
UNKNOWN/NOT REPORTED												
RECORDS	4	5	13	4	10	10	12	10	5	23	96	
ACCIDENTS	4	5	13	4	10	10	12	10	5	23		96

TABLE 8 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKE OFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN										4	4
INITIAL CLIMB	1	1				1	1				
VERTICAL											
RUNNING											
ABORTED											
ABORTED											
ABORTED											
OTHER											
IN FLIGHT											
CLIMB TO CRUISE										1	1
NORMAL CRUISE		1					1			1	1
DESCENDING											
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS											

TABLE 8 (CONT'D)

	Cessna 170 Series	Cessna 172 Series	Cessna 175 Series	Cessna 180 Series	Cessna 182 Series	Cessna 210 Series	Cessna 310 Series	Cessna 206 Series	Cessna 336/337 Series	RECORDS	ACCIDENTS
BUZZING											
UNCONTROLLED DESCENT											
EMERGENCY DESCENT											
LOW PASS		1									
OTHER										1	1
EN ROUTE TO TREAT CROP											
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA											
STARTING SWATH RUN											
SWATH RUN											
FLAREOUT FOR SWATH RUN											
PULLUP FROM SWATH RUN											
PROCEDURE TURNAROUND											
CLEANUP SWATH											
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING							1				
FINAL APPROACH	2	3			3					1	1
INITIAL APPROACH										8	8
FINAL APPROACH											
LEVEL OFF/TOUCHDOWN											
ROLL											
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND	2	8	1	1	3		1			16	16
MISSED APPROACH		1	1		2					4	4
OTHER											
UNKNOWN/NOT REPORTED											
RECORDS	5	14	3	1	8	3	1	1		36	
ACCIDENTS	5	14	3	1	8	3	1	1			36

TABLE 8 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKE OFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN											
INITIAL CLIMB											
VERTICAL											
RUNNING											
ABORTED											
ABORTED											
ABORTED											
OTHER											
IN FLIGHT											
CLIMB TO CRUISE											
NORMAL CRUISE											
DESCENDING											
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS											
BUZZING											
UNCONTR											
EMERGEN											
LOW PAS											
OTHER											
EN ROUT											
EN ROUT											
SURVEY											
STARTIN											
SWATH R											
FLAREOU											
PULLUP											
PROCEDU											
CLEANUP											
MANEUVE											
RETURN											
LANDING											
TRAFFIC											
FINAL A											
INITIAL											
FINAL A											
LEVEL (											
ROLL											
ROLL-OU											
POWER-(											
POWER-(											
GO-ARO											
MISSED											
OTHER											
UNKNOW											
RECORDS											
ACCIDENT											

TABLE 8 (CONT'D)

	Cessna 177	Forney/415 Series	Luscombe 8 Series	Mooney M-20 Series	Navion Series	Piper J3/PA-11 Series	Piper PA-12 Series	Piper PA-18 Series	Piper PA-22 Series	RECORDS	ACCIDENTS
BUZZING	1									1	1
UNCONTROLLED DESCENT											
EMERGENCY DESCENT				1						1	1
LOW PASS											
OTHER			1	1		2		1		5	5
EN ROUTE TO TREAT CROP											
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA											
STARTING SWATH RUN											
SWATH RUN											
FLAREOUT FOR SWATH RUN											
PULLUP FROM SWATH RUN											
PROCEDURE TURNAROUND							1			1	1
CLEANUP SWATH							1			1	1
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING											
FINAL APPROACH	1	4	1	2		8	3	2	2	23	23
INITIAL APPROACH											
FINAL APPROACH											
LEVEL OFF/TOUCHDOWN											
ROLL											
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND	2		1	2	1	1		2	1	10	10
MISSED APPROACH											
OTHER			1		1			1	1	4	4
UNKNOWN/NOT REPORTED											
RECORDS	4	4	7	9	2	16	3	8	6	59	
ACCIDENTS	4	4	7	9	2	16	3	8	6		59

TABLE 8 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
STATIC											
STARTING ENGINE/S											
IDLING ENGINE/S											
ENGINE RUNUP											
IDLING ROTORS											
PARKED-ENGINES NOT OPERATING											
OTHER											
TAXI											
TO TAKE OFF											
FROM LANDING											
OTHER											
GROUND TAXI TO TAKEOFF											
GROUND TAXI FROM LANDING											
GROUND TAXI, OTHER											
AERIAL TAXI TO TAKEOFF											
AERIAL TAXI TO/FROM LANDING											
AERIAL TAXI, OTHER											
TAKEOFF											
RUN										13	13
INITIAL CLIMB	3		2	2	3	1		2			
VERTICAL											
RUNNING											
ABORTED											
ABORTED											
ABORTED											
OTHER											
IN FLIGHT										1	1
CLIMB TO CRUISE				1						2	2
NORMAL CRUISE	1				1						
DESCENDING											
HOLDING											
HOVERING											
POWER-ON DESCENT											
AUTOROTATIVE DESCENT											
ACROBATICS											

TABLE 8 (CONT'D)

	Piper PA-23 Series	Piper PA-24 Series	Piper PA-25 Series	Piper P-28 Series	Piper PA-30 Series	Piper PA-32 Series	Taylorcraft B Series	Globe GC-1 Series	Stinson 108 Series	RECORDS	ACCIDENTS
BUZZING											
UNCONTROLLED DESCENT											
EMERGENCY DESCENT											
LOW PASS											
OTHER											
EN ROUTE TO TREAT CROP			2	1						3	3
EN ROUTE TO RELOADING AREA											
SURVEY FIELD/AREA											
STARTING SWATH RUN											
SWATH RUN											
FLAREOUT FOR SWATH RUN											
PULLUP FROM SWATH RUN											
PROCEDURE TURNAROUND		1								1	1
CLEANUP SWATH		1								1	1
MANEUVER TO AVOID OBSTRUCTION											
RETURN TO STRIP											
LANDING											
TRAFFIC PATTERN-CIRCLING											
FINAL APPROACH	1	2	2	6	2	1	1	2	4	21	21
INITIAL APPROACH											
FINAL APPROACH											
LEVEL OFF/TOUCHDOWN											
ROLL									1	1	1
ROLL-ON/RUN-ON											
POWER-ON LANDING											
POWER-OFF AUTOROTATIVE LANDIN											
GO-AROUND											
MISSED APPROACH	2			4	3			1	1	11	11
OTHER		1									
UNKNOWN/NOT REPORTED									1	2	2
RECORDS	7	3	6	15	10	2	1	3	9	56	
ACCIDENTS	7	3	6	15	10	2	1	3	9		56

TABLE 9

AIRCRAFT MAKE AND MODEL BY PILOT CERTIFICATE
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	STUDENT	PRIVATE	COMMERCIAL	ATR	PRIVATE/FL. INSTR.	COMMERCIAL/FL. INSTR.	ATR/FL. INSTR.	OTHER	NONE	UNKNOWN/NOT REPORTED	RECORDS	ACCIDENTS
Commander 500/600 Series		1	3	1		2					7	7
nca 11 Series									1		16	16
nca 7 Series	7	8									76	76
n D-18/E-18/G-18	10	41	12			11	1		1		9	9
h 35/35-33 Series		1	3	1		4					33	33
h 95/95-55 Series	1	25	4			3					18	18
h A23 Series		7	6			3	2				17	17
ng 75 Series	3	8	1			4	1				35	35
sna 120/140		2	24	4		5					26	26
sna 150 Series	7	13	3			3					140	140
sna 170 Series	53	49	8			29			1		20	20
sna 172 Series	6	11	2			1					59	59
sna 175 Series	8	32	12			6			1		5	5
sna 180 Series		3	2								9	9
sna 182 Series		3	3			3					17	17
sna 185 Series		14	1			2					1	1
sna 210 Series			1								9	9
sna 310 Series			4			3	1			1	3	3
sna 206 Series		1	1	1							4	4
sna 336/337 Series		1	1	1		1					18	18
sna 177	1	12	3			2					13	13
rney/415 Series	3	6	2			2					27	27
scombe 8 Series	4	14	1			7			1		35	35
ney M-20 Series	3	23	4	1		3	1				5	5
Navion Series		3	1			1					81	81
Piper J3/PA-11 Series	20	29	17			12	1		2		11	11
Piper PA-12 Series	4	4	3								82	82
Piper PA-18 Series	8	20	41			12	1				27	27
Piper PA-22 Series	8	15	1			2			1		12	12
Piper PA-23 Series		5	1			5	1				12	12
Piper PA-24 Series		8	2			1	1				36	36
Piper PA-25 Series		1	25			7	1	1		1	49	49
Piper PA-28 Series	10	24	2			13					18	18
Piper PA-30 Series		6	2			9	1				8	
Piper PA-32 Series		3	1			4					27	2
Taylorcraft B Series	7	18				1	1					
Globe GC-1 Series												
Stinson 108 Series												

RECORDS

ACCIDENTS

TABLE 9 (CONT'D)

	STUDENT	PRIVATE	COMMERCIAL	ATR	PRIVATE/ FL. INSTR.	COMMERCIAL/ FL. INSTR.	ATR/ FL. INSTR.	OTHER	NONE	UNKNOWN/ NOT REPORTED	RECORDS	ACCIDENTS
Globe GC-1 Series	1	1	4		2						8	8
Robinson 108 Series	2	13	2							1	18	18
RECORDS	166	425	203	9	163	13	1	8	3		991	
ACCIDENTS	166	425	203	9	163	13	1	8	3			991

TABLE 10

FIRST TYPE OF ACCIDENT BY INJURY INDEX
WHEN STALL OR STALL/SPIN WAS SECOND ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
NONE					8	8	3.24
GROUND-WATER LOOP-SWERVE			1	7			
DRAGGED WINGTIP, POD, OR FLOA					1	1	.40
WHEELS-UP LANDING			1				
WHEELS-DOWN LANDING IN WATER							
GEAR COLLAPSED							
GEAR RETRACTED					9	9	3.64
HARD LANDING	2	2	4	1			
NOSE OVER/DOWN							
ROLL OVER					25	25	10.12
OVERSHOOT	4	5	8	8	10	10	4.05
UNDERSHOOT	2		4	4			
COLLISION BETWEEN AIRCRAFT							
BOTH IN FLIGHT							
ONE AIRBORNE							
BOTH ON GROUND							
COLLISION WITH GROUND/WATER							
CONTROLLED							
UNCONTROLLED							
COLLIDED WITH							
WIRES/POLES							
TREES							
RESIDENCE/S							
BUILDING/S							
FENCE, FENCEPOSTS							
ELECTRONIC TOWERS							
RUNWAY OR APPROACH LIGHTS							
AIRPORT HAZARD							
ANIMALS							
CROP							
FLAGMAN LOADER							
DITCHES							
SNOWBANK							
PARKED AIRCRAFT							
AUTOMOBILE							
DIRT BANK							

TABLE 10 (CONT'D)

OBJECT	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS	PERCENT
BIRD STRIKE	1				1	1	.40
STALL							
SPIN							
SPIRAL							
MUSH							
FIRE OR EXPLOSION							
IN FLIGHT							
ON GROUND							
AIRFRAME FAILURE							
IN FLIGHT							
ON GROUND							
ENGINE TEARAWAY							
ENGINE FAILURE OR MALFUNCTION	79	42	36	33	190	190	76.92
PROPELLER/ROTOR FAILURE							
PROPELLER			1	1	2	2	.81
TAIL ROTOR							
MAIN ROTOR							
PROPELLER/ROTOR ACCIDENT TO P							
JET INTAKE/EXHAUST ACCIDENT T							
PROPELLER/JET/ROTOR BLAST							
TURBULENCE							
HAIL DAMAGE TO AIRCRAFT	1				1	1	.40
LIGHTNING STRIKE							
EVASIVE MANEUVER							
UNCONTROLLED ALTITUDE DEVIATI							
DITCHING							
MISSING AIRCRAFT, NOT RECOVER							
MISCELLANEOUS/OTHER							
UNDETERMINED							
OTHER							
RECORDS	89	49	55	54	247		
ACCIDENTS	89	49	55	54		247	
PERCENT	.0	36.0	19.8	22.3	21.9	.0	.0

TABLE 11

FIRST TYPE OF ACCIDENT BY AIRCRAFT MAKE AND MODEL
WHEN STALL OR STALL/SPIN WAS SECOND ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	GROUND-WATER LOOP-SWERVE	WHEELS-UP LANDING	HARD LANDING	OVERSHOOT	UNDERSHOOT	COLLIDED WITH OBJECT	ENGINE FAILURE OR MALFUNCTION	PROPELLER FAILURE	TURBULENCE	RECORDS	ACCIDENTS	PERCENT
NONE						4				4	4	1.62
Aero Commander 500/600 Series	1					4				5	5	2.02
Aeronca 11 Series				1		12				13	13	5.26
Aeronca 7 Series		1				3				4	4	1.62
Beech D-18/E-18/G-18						10				10	10	4.05
Beech 35/35-33 Series		1				9				10	10	4.05
Beech 95/95-55 Series	1	1	1			9				12	12	4.86
Beech A23 Series						9	1			10	10	4.05
Boeing 75 Series			1			4				5	5	2.02
Cessna 120/140		1	4	3		15				23	23	9.31
Cessna 150 Series	1		1	1		2				5	5	2.02
Cessna 170 Series		2	5			6		1		14	14	5.67
Cessna 172 Series						3				3	3	1.21
Cessna 175 Series						1				1	1	.40
Cessna 180 Series			3	1		4				8	8	3.24
Cessna 182 Series												
Cessna 210 Series						3				3	3	1.21
Cessna 310 Series						1				1	1	.40
Cessna 206 Series						1				1	1	.40
Cessna 336/337 Series			2		1	1				4	4	1.62
Cessna 177				1		3				4	4	1.62
Forney/415 Series	2		1			4				7	7	2.83
Luscombe 8 Series			1			8				9	9	3.64
Mooney M-20 Series		1				1				2	2	.81
Navion Series	2					14				16	16	6.48
Piper J3/PA-11 Series						3				3	3	1.21
Piper PA-12 Series			2	1		5				8	8	3.24
Piper PA-18 Series			1			5				6	6	2.43
Piper PA-22 Series						7				7	7	2.83
Piper PA-23 Series				1		2				3	3	1.21
Piper PA-24 Series						6				6	6	2.43
Piper PA-25 Series	1		2	1		11				15	15	6.07
Piper PA-28 Series		1				8	1			10	10	4.05
Piper PA-30 Series						2				2	2	.81
Piper PA-32 Series						1				1	1	.40
Taylorcraft B Series												

TABLE 11 (CONT'D)

	GROUND-WATER LOOP-SWERVE	WHEELS-UP LANDING	HARD LANDING	OVERSHOOT	UNDERSHOOT	COLLIDED WITH OBJECT	ENGINE FAILURE OR MALFUNCTION	PROPELLER FAILURE	TURBULENCE	RECORDS	ACCIDENTS	PERCENT
Globe GC-1 Series			1				2			3	3	1.21
Stinson 108 Series				1	1		7			9	9	3.64
RECORDS	8	1	9	25	10	1	190	2	1	247		
ACCIDENTS	8	1	9	25	10	1	190	2	1		247	
PERCENT	3.2	.4	3.6	10.1	4.0	.4	76.9	.8	.4			

TABLE 12

BROAD CAUSES/FACTORS
STALL OR STALL/SPIN AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

NVOLVES 744 TOTAL ACCIDENTS
NVOLVES 338 FATAL ACCIDENTS

BROAD CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*
PILOT	327 96.75	36 10.65	327 96.75	397 97.78	29 7.14	397 97.78	724 97.31	65 8.74	724 97.31
PERSONNEL	1 .30	4 1.18	5 1.48	4 .99	2 .49	6 1.48	5 .67	6 .81	11 1.48
AIRFRAME	.00	.00	.00	.00	.00	.00	.00	.00	.00
LANDING GEAR	.00	.00	.00	.00	.00	.00	.00	.00	.00
POWERPLANT	1 .30	1 .30	2 .59	.00	.00	.00	1 .13	1 .13	2 .27
SYSTEMS	1 .30	1 .30	2 .59	1 .25	.00	1 .25	2 .27	1 .13	3 .40
INSTRUMENTS/EQUIPMENT AND ACCESSORIES	.00	2 .59	2 .59	.00	.00	.00	.00	2 .27	2 .27
ROTORCRAFT	.00	.00	.00	.00	.00	.00	.00	.00	.00
AIRPORTS/AIRWAYS/FACILITIES	.00	2 .59	2 .59	.00	10 2.46	10 2.46	.00	12 1.61	12 1.61
WEATHER	9 2.66	41 12.13	48 14.20	11 2.71	63 15.52	74 18.23	20 2.69	104 13.98	122 16.40
TERRAIN	1 .30	6 1.78	7 2.07	.00	11 2.71	11 2.71	1 .13	17 2.28	18 2.42
MISCELLANEOUS	11 3.25	2 .59	13 3.85	14 3.45	6 1.48	20 4.93	25 3.36	8 1.08	33 4.44
UNDETERMINED	9 2.66	.00	9 2.66	1 .25	.00	1 .25	10 1.34	.00	10 1.34

* 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

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

TABLE 13

DETAILED CAUSES/FACTORS
STALL OR STALL/SPIN AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 744 TOTAL ACCIDENTS
INVOLVES 338 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	3	1	4				3	1	4
ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL	6	1	7	7	2	9	13	3	16
BECAME LOST/DISORIENTED	1	1	2	1		1	2	1	3
CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS	13		13	4		4	17		17
CONTINUED INTO KNOWN AREA OF SEVERE TURBULENCE				1		1	1		1
DELAYED ACTION IN ABORTING TAKEOFF				1		1	1		1
DELAYED IN INITIATING GO-AROUND	1		1	8	1	9	9	1	10
DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT	14	8	22	17	2	19	31	10	41
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	311		311	356		356	667		667
FAILED TO USE OR INCORRECTLY USED MISC EQUIPMENT		1	1	1		1	1	1	2
FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC	2	2	4		2	2	2	4	6
IMPROPER OPERATION OF POWERPLANT + POWERPLANT CONTROLS		1	1	1		1	1	1	2
IMPROPER OPERATION OF FLIGHT CONTROLS	11		11	10		10	21		21
PREMATURE LIFT OFF				12		12	12		12
IMPROPER LEVEL OFF		1	1	1		1	1	1	2
IMPROPER IFR OPERATION	1		1				1		1
IMPROPER IN-FLIGHT DECISIONS OR PLANNING	11	1	12	4		4	15	1	16
IMPROPER COMPENSATION FOR WIND CONDITIONS	1		1	1	4	5	2	4	6
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING	19	5	24	18	2	20	37	7	44
INADEQUATE SUPERVISION OF FLIGHT	2		2	20		20	22		22
LACK OF FAMILIARITY WITH AIRCRAFT	1	7	8	1	4	5	2	11	13
EXERCISED POOR JUDGMENT	17		17	8		8	25		25
OPERATED CARELESSLY				1		1	1		1
SELECTED UNSUITABLE TERRAIN	2		2	5		5	7		7
SPONTANEOUS-IMPROPER ACTION	1		1	3		3	4		4
MISJUDGED DISTANCE AND SPEED				2		2	2		2
MISJUDGED ALTITUDE AND CLEARANCE				1		1	1		1
MISJUDGED ALTITUDE	2		2	1	1	2	3	1	4
INCAPACITATION	1		1				1		1
PHYSICAL IMPAIRMENT	24	7	31	6	1	7	30	8	38
SPATIAL DISORIENTATION	4		4	2		2	6		6
MISUSED OR FAILED TO USE FLAPS	1	2	3	7	12	19	8	14	22
FAILED TO MAINTAIN DIRECTIONAL CONTROL				1		1	1		1
SELECTED WRONG RUNWAY RELATIVE TO EXISTING WIND	2		2	2	1	3	4	1	5
FAILED TO ABORT TAKEOFF				6		6	6		6
FAILED TO INITIATE GO-AROUND	1		1				1		1
DIRECT ENTRIES	3		3				3		3
SUBTOTAL	455	38	493	509	32	541	964	70	1034
COPILOT									
FAILED TO OBTAIN/MAINTAIN FLYING SPEED				4		4	4		4
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING				1		1	1		1
LACK OF FAMILIARITY WITH AIRCRAFT				1		1	1		1
CONTROL INTERFERENCE		1	1					1	1
SUBTOTAL		1	1	6		6	6	1	7
DUAL STUDENT									
DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT				1		1	1		1
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	2		2	14		14	16		16
IMPROPER OPERATION OF FLIGHT CONTROLS				1		1	1		1
IMPROPER COMPENSATION FOR WIND CONDITIONS				1		1	1		1
CONTROL INTERFERENCE				1		1	1		1
MISUSED OR FAILED TO USE FLAPS				1		1	1		1
FAILED TO MAINTAIN DIRECTIONAL CONTROL				1		1	1		1
SUBTOTAL	2		2	20		20	22		22

TABLE 13 (CONT'D)

PERSONNEL (CONTINUED)	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** PERSONNEL **									
FLIGHT INSTRUCTOR									
INADEQUATE SUPERVISION OF FLIGHT	1		1				1		1
INADEQUATE TRAINING OF STUDENT				1		1	1		1
MAINTENANCE, SERVICING, INSPECTION									
INADEQUATE MAINTENANCE AND INSPECTION		2	2					2	2
OPERATIONAL SUPERVISORY PERSONNEL									
INADEQUATE SUPERVISION OF FLIGHT CREW					1	1		1	1
WEATHER PERSONNEL									
TRAFFIC CONTROL PERSONNEL									
AIRPORT SUPERVISORY PERSONNEL									
FAILURE TO NOTIFY OF UNSAFE CONDITION				1		1	1		1
AIRWAYS FACILITIES PERSONNEL									
PRODUCTION-DESIGN									
MISCELLANEOUS-PERSONNEL									
PILOT OF OTHER AIRCRAFT		1	1					1	1
PASSENGER				1		1	1		1
DRIVER OF VEHICLE		1	1					1	1
OTHER				1	1	2	1	1	2
THIRD PILOT									
FLIGHT ENGINEER									
DISPATCHING									
SUBTOTAL	1	4	5	4	2	6	5	6	11
** POWERPLANT **									
ENGINE STRUCTURE									
IGNITION SYSTEM									
FUEL SYSTEM									
LUBRICATING SYSTEM									
COOLING SYSTEM									
PROPELLER AND ACCESSORIES									
EXHAUST SYSTEM									
STACKS	1		1				1		1
OTHER		1	1					1	1
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	2				1	1	2
** SYSTEMS **									
ELECTRICAL SYSTEM									
HYDRAULIC SYSTEM									
FLIGHT CONTROL SYSTEMS									
WING FLAP CONTROL SYSTEM (ELECTRICAL)	1		1				1		1
ANTI-ICING, DE-ICING SYSTEMS									
AIR CONDITION, HEATING AND PRESSURIZATION									
AUTO PILOT									

SYSTEMS (CONTINUED)

TABLE 13 (CONT'D)

	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
FIRE WARNING SYSTEM									
FIRE EXTINGUISHER SYSTEM									
OXYGEN SYSTEM									
OTHER SYSTEMS									
PITOT SYSTEM									
OTHER		1	1					1	1
SUBTOTAL				1		1	1		1
** INSTRUMENTS/EQUIPMENT AND ACCESSORIES **	1	1	2	1		1	2	1	3
FLIGHT AND NAVIGATION INSTRUMENTS									
AIRSPEED									
COMMUNICATIONS AND NAVIGATION EQUIPMENT		1	1						
MISCELLANEOUS EQUIPMENT								1	1
OTHER									
SUBTOTAL		1	1					1	1
** AIRPORTS/AIRWAYS/FACILITIES **		2	2					2	2
AIRPORT FACILITIES									
AIRPORT CONDITIONS									
HIGH VEGETATION									
POORLY MAINTAINED RUNWAY SURFACE									
SOFT RUNWAY					4	4			
OTHER					3	3		4	4
AIRWAYS FACILITIES		1	1		2	2		3	3
SUBTOTAL		1	1		2	2		3	3
** WEATHER **		2	2		11	11		13	13
LOW CEILING									
RAIN	1	11	12						
FOG		4	4		4	4	1	15	16
SNOW		9	9	1	1	1		5	5
ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC	1	3	4		5	6	1	14	15
UNFAVORABLE WIND CONDITIONS	4	3	7	3	1	1	1	4	5
SUDDEN WINDSHIFT	1	8	9	5	2	5	7	5	12
TURBULENCE IN FLIGHT, CLEAR AIR					17	22	6	25	31
TURBULENCE, ASSOCIATED W/CLOUDS, THUNDERSTORMS	1		1		2	2		2	2
DOWNDRAFTS, UPDRAFTS	1	3	4	1	1	1	1	1	2
HIGH TEMPERATURE	1	2	3	1	1	2	2	4	6
HIGH DENSITY ALTITUDE		3	3		9	10	2	11	13
THUNDERSTORM ACTIVITY	2	9	11		13	13		16	16
OTHER		3	3		19	19	2	28	30
SUBTOTAL					1	1		4	4
** TERRAIN **	12	58	70	11	77	88	23	135	158
WET, SOFT GROUND					1	1			
HIGH VEGETATION					3	3		1	1
ROUGH/UNEVEN					1	1		3	3
HIGH OBSTRUCTIONS					4	4	1	1	1
SANDY	1	6	7		1	1		10	11
OTHER					1	1		1	1
SUBTOTAL	1	6	7		11	11	1	17	18
** MISCELLANEOUS **									
EVASIVE MANEUVER TO AVOID COLLISION									
UNQUALIFIED PERSON OPERATED AIRCRAFT	10	1	11	8	4	12	18	5	23
FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS	1		1	3	2	5	4	2	6
UNDETERMINED		1	1	2		2	2	1	3
DIRECT ENTRIES	9		9	1		1	10		10
SUBTOTAL				1		1	1		1
	20	2	22	15	6	21	35	8	43

TABLE 13 (CONT'D)

MISCELLANEOUS (CONTINUED)	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
GRAND TOTAL	493	115	608	566	139	705	1059	254	1313
** MISCELLANEOUS ACTS, CONDITIONS **									
ANTI-ICING/DEICING EQUIP-IMPROPER OPER. OF/FAILED TO USE		1	1					1	1
CHECKLIST-FAILED TO USE		1	1					1	1
GUST LOCKS ENGAGED		1	1					1	1
NOT ALLIGNED WITH RUNWAY/INTENDED LANDING AREA	1		1	2	6	8	3	6	9
UNWARRANTED LOW FLYING	51	21	72	14	20	34	65	41	106
FAILED TO USE ALL AVAILABLE RUNWAY					3	3		3	3
FLEW INTO BLIND CANYON	5	3	8	5	3	8	10	6	16
POORLY PLANNED APPROACH	1	6	7	4	8	12	5	14	19
JETTISONED LOAD		2	2		2	2		4	4
STOLEN OR UNAUTHORIZED USE OF AIRCRAFT		5	5		5	5		10	10
IMPROPERLY SECURED		1	1					1	1
INCORRECT TRIM SETTING	1		1				1		1
PILOT FATIGUE		3	3		1	1		4	4
PILOT SUFFERED HEART ATTACK	1		1				1		1
ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT	23	5	28	3		3	26	5	31
CARBON MONOXIDE POISONING	1	1	2				1	1	2
ICE-CARBURETOR		1	1					1	1
AIRFRAME ICE	3	1	4	6	1	7	9	2	11
ICE-WINDSHIELD				1		1	1		1
IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG	5	12	17	3	4	7	8	16	24
INTERFERENCE WITH FLIGHT CONTROLS				1		1	1		1
AIRCRAFT CAME TO REST IN WATER		17	17		24	24		41	41
TOUCH AND GO LANDING		1	1		1	1		2	2
MATERIAL FAILURE	1		1				1		1
UNAPPROVED MODIFICATION		1	1					1	1
RUNWAY CLOSED					1	1		1	1
DOWNWIND		3	3		7	7		10	10
DETERIORATED		1	1					1	1
ERRATIC		1	1					1	1

DIRECT ENTRY CAUSES

PILOT-INADVERTENT SPIN FOR UNDETERMINED REASON.
MISC-CONTROL LOSS DUE TO SEAT SLIDING BACK.
PILOT-POOR TCHNIQUE OR LACK OF KNOWLEDGE-SPIN RCVRY
PILOT-NEGLIGENT AND RECKLESS FLYING.

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

TABLE 14

BROAD CAUSES/FACTORS
ENGINE FAILURE/MALFUNCTION AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 190 TOTAL ACCIDENTS
INVOLVES 79 FATAL ACCIDENTS

BROAD CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*
PILOT	42 53.16	3 3.80	43 54.43	60 54.05	2 1.80	60 54.05	102 53.68	5 2.63	103 54.21
PERSONNEL	13 16.46	1 1.27	14 17.72	10 9.01	.00	10 9.01	23 12.11	1 .53	24 12.63
AIRFRAME	.00	.00	.00	.00	.00	.00	.00	.00	.00
LANDING GEAR	.00	.00	.00	.00	.00	.00	.00	.00	.00
POWERPLANT	33 41.77	1 1.27	33 41.77	41 36.94	1 .90	42 37.84	74 38.95	2 1.05	75 39.47
SYSTEMS	.00	.00	.00	.00	.00	.00	.00	.00	.00
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	3 3.80	2 2.53	5 6.33	5 4.50	7 6.31	11 9.91	8 4.21	9 4.74	16 8.42
TERRAIN	.00	.00	.00	.00	.00	.00	.00	.00	.00
MISCELLANEOUS	4 5.06	.00	4 5.06	6 5.41	.00	6 5.41	10 5.26	.00	10 5.26
UNDETERMINED	.00	.00	.00	.00	.00	.00	.00	.00	.00

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 15

DETAILED CAUSES/FACTORS
ENGINE FAILURE/MALFUNCTION AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 190 TOTAL ACCIDENTS
INVOLVES 79 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	2		2	2		2	4		4
ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL	1		1				1		1
BECAME LOST/DISORIENTED				1		1	1		1
CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS	1		1	2		2	3		3
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	2		2	1		1	3		3
FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC	1		1	5		5	6		6
IMPROPER OPERATION OF POWERPLANT + POWERPLANT CONTROLS	5		5	18		18	23		23
IMPROPER IN-FLIGHT DECISIONS OR PLANNING	4		4		1	1	4	1	5
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING	17	1	18	26		26	43	1	44
INADEQUATE SUPERVISION OF FLIGHT	1		1	3		3	4		4
LACK OF FAMILIARITY WITH AIRCRAFT	1	2	3		1	1	1	3	4
MISMANAGEMENT OF FUEL	17		17	12		12	29		29
EXERCISED POOR JUDGMENT				2		2	2		2
IMPROPER STARTING PROCEDURES	1		1				1		1
SPONTANEOUS-IMPROPER ACTION				1		1	1		1
MISJUDGED ALTITUDE	1		1				1		1
PHYSICAL IMPAIRMENT	2		2				2		2
SELECTED WRONG RUNWAY RELATIVE TO EXISTING WIND					1	1		1	1
FAILED TO ABORT TAKEOFF	2		2				2		2
SUBTOTAL	58	3	61	73	3	76	131	6	137
DUAL STUDENT									
FAILED TO OBTAIN/MAINTAIN FLYING SPEED				1		1	1		1
IMPROPER OPERATION OF POWERPLANT + POWERPLANT CONTROLS				1		1	1		1
MISMANAGEMENT OF FUEL				1		1	1		1
SPONTANEOUS-IMPROPER ACTION				1		1	1		1
SUBTOTAL				4		4	4		4
** PERSONNEL **									
FLIGHT INSTRUCTOR									
MAINTENANCE, SERVICING, INSPECTION				1		1	1		1
IMPROPER MAINTENANCE(MAINTENANCE PERSONNEL)				1		1	1		1
IMPROPER MAINTENANCE(OWNER PERSONNEL)							1		1
IMPROPERLY SERVICED AIRCRAFT(OWNER-PILOT)	1		1						
INADEQUATE MAINTENANCE AND INSPECTION	12	1	13	8		8	20	1	21
OPERATIONAL SUPERVISORY PERSONNEL									
WEATHER PERSONNEL									
TRAFFIC CONTROL PERSONNEL									
AIRPORT SUPERVISORY PERSONNEL									
AIRWAYS FACILITIES PERSONNEL									
PRODUCTION-DESIGN									
POOR/INADEQUATE DESIGN	1		1				1		1
MISCELLANEOUS-PERSONNEL									
THIRD PILOT									
FLIGHT ENGINEER									
DISPATCHING									
SUBTOTAL	14	1	15	10		10	24	1	25
** POWERPLANT **									
ENGINE STRUCTURE				1		1	1		1
CRANKSHAFT				2		2	4		4
MASTER AND CONNECTING RODS	2		2	1		1	1		1
CYLINDER ASSEMBLY							1		1
PISTON, PISTON RINGS	1		1						
VALVE ASSEMBLIES				1		1	1		1

TABLE 15 (CONT'D)

POWERPLANT (CONTINUED)	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTA
OTHER									
IGNITION SYSTEM									
MAGNETOES				1		1	1		1
SPARK PLUG	2	1	3	2		2	4	1	5
IGNITION HARNESS, SHIELDING	3		3	4		4	7		7
FUEL SYSTEM				1		1	1		1
LINES AND FITTINGS	3		3	1		1	4		4
SELECTOR VALVES	1		1				1		1
FILTERS, STRAINERS, SCREENS	1		1				1		1
PRIMING SYSTEM	1		1				1		1
CARBURETOR	1		1				1		1
FUEL INJECTION SYSTEM	3		3	4		4	7		7
LUBRICATING SYSTEM	1		1	1		1	2		2
LINES, HOSES, FITTINGS				1		1	1		1
COOLING SYSTEM									
PROPELLER AND ACCESSORIES				1		1	1		1
EXHAUST SYSTEM									
MUFFLERS				1		1	1		1
ENGINE ACCESSORIES									
ENGINE CONTROLS-COCKPIT									
POWERPLANT-INSTRUMENTS									
FUEL QUANTITY GAUGE									
MISCELLANEOUS									
POWERPLANT FAILURE FOR UNDETERMINED REASONS					1	1		1	1
REDUCTION GEAR ASSEMBLY	16		16	21		21	37		37
COMPRESSOR ASSEMBLY									
OTHER	1		1				1		1
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	35	1	36	42	1	43	77	2	79
** WEATHER **									
LOW CEILING		1	1		2	2		3	3
RAIN		1	1		1	1		2	2
FOG		1	1					1	1
ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC	3	1	4	5	1	1	8	1	1
CONDITIONS CONDUCIVE TO CARB/INDUCTION SYSTEM ICING					4	9		5	13
UNFAVORABLE WIND CONDITIONS		1	1		2	2		2	2
HIGH TEMPERATURE								1	1
SUBTOTAL	3	5	8	5	10	15	8	15	23
** MISCELLANEOUS **									
EVASIVE MANEUVER TO AVOID COLLISION	4		4	1		1	1		1
FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS				5		5	9		9
SUBTOTAL	4		4	6		6	10		10
GRAND TOTAL	114	10	124	140	14	154	254	24	278

TABLE 15 (CONT'D)

MISCELLANEOUS ACTS, CONDITIONS (CONTINUED)	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** MISCELLANEOUS ACTS, CONDITIONS **									
ANTI-ICING/DEICING EQUIP-IMPROPER OPER. OF/FAILED TO USE	4		4	12		12	16		16
DISREGARD OF GOOD OPERATING PRACTICE		1	1					1	1
IMPROPER EMERGENCY PROCEDURES	1		1		1	1	1	1	2
UNWARRANTED LOW FLYING					1	1		1	1
INATTENTIVE TO FUEL SUPPLY	2		2	4		4	6		6
MISCALCULATED FUEL CONSUMPTION				2		2	2		2
STOLEN OR UNAUTHORIZED USE OF AIRCRAFT	1		1				1		1
IMPROPERLY SECURED	1		1	2		2	3		3
ENGINE LOADED UP				3		3	3		3
FATIGUE FRACTURE	2		2	1		1	3		3
FAILURE OF TWO OR MORE ENGINES	2		2				2		2
SEPARATION IN FLIGHT					1	1		1	1
FIRE IN ENGINE	1		1				1		1
CORRODED/CORROSION	1		1	1		1	2		2
PILOT FATIGUE	1		1				1		1
FUEL EXHAUSTION	7		7	16		16	23		23
FUEL CONTAMINATION-EXCLUSIVE OF WATER IN FUEL	1		1	1		1	2		2
ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT	1		1				1		1
ICE-IN FUEL	1		1				1		1
ICE-CARBURETOR	4		4	11		11	15		15
IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG		1	1					1	1
LACK OF LUBRICATION-SPECIFIC PART, NOT SYSTEM				1		1	1		1
OIL EXHAUSTION-ENGINE LUBRICATION SYSTEM	1		1				1		1
SIMULATED CONDITIONS	9		9	11	2	13	20	2	22
WATER IN FUEL	3		3	3		3	6		6
AIRCRAFT CAME TO REST IN WATER					2	2		2	2
TOUCH AND GO LANDING		1	1					1	1
MATERIAL FAILURE	3		3	5		5	8		8
FUEL STARVATION	24		24	22		22	46		46
OIL STARVATION	1		1	1		1	2		2
IMPROPER CLEARANCE-TOLERANCE	1		1	3		3	4		4
FUEL SELECTOR POSITIONED BETWEEN TANKS	5		5				5		5
PREVIOUS DAMAGE				1		1	1		1
LEAK/LEAKAGE				1		1	1		1
CARBON DEPOSITS	1		1	1		1	2		2
LOOSE, PART/FITTING	1		1	1		1	2		2
BURNED		1	1					1	1
CHAFFED	1		1	1		1	2		2
CROSSED	1		1				1		1
GROUNDED				1		1	1		1
IMPROPERLY INSTALLED	1		1				1		1
JAMMED				1		1	1		1
OBSTRUCTED				1		1	1		1
STICKING					1	1		1	1
STUCK				1		1	1		1
EXCESSIVE TEMPERATURE	1		1						

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

TABLE 16

BROAD CAUSES/FACTORS
OVERSHOOT AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 25 TOTAL ACCIDENTS
INVOLVES 4 FATAL ACCIDENTS

BROAD CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*
PILOT	4 100.00	.00	4 100.00	21 100.00	5 23.81	21 100.00	25 100.00	5 20.00	25 100.00
PERSONNEL	.00	.00	.00	.00	.00	.00	.00	.00	.00
AIRFRAME	.00	.00	.00	.00	.00	.00	.00	.00	.00
LANDING GEAR	.00	.00	.00	.00	.00	.00	.00	.00	.00
POWERPLANT	.00	.00	.00	.00	.00	.00	.00	.00	.00
SYSTEMS	.00	.00	.00	.00	.00	.00	.00	.00	.00
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 4.76	1 4.76	.00	1 4.00	1 4.00
TERRAIN	.00	1 25.00	1 25.00	.00	3 14.29	3 14.29	.00	4 16.00	4 16.00
MISCELLANEOUS	.00	.00	.00	.00	1 4.76	1 4.76	.00	1 4.00	1 4.00
UNDETERMINED	.00	.00	.00	.00	.00	.00	.00	.00	.00
	.00	.00	.00	.00	.00	.00	.00	.00	.00

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 17

DETAILED CAUSES/FACTORS
OVERSHOOT AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 25 TOTAL ACCIDENTS
INVOLVES 4 FATAL ACCIDENTS

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** PILOT **									
PILOT IN COMMAND					1	1		1	1
BECAME LOST/DISORIENTED					2	11	10	2	12
DELAYED IN INITIATING GO-AROUND	1		1	9	1	1		1	1
FAILED TO USE OR INCORRECTLY USED MISC EQUIPMENT					1	1		1	1
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING	4		4	21		21	25		25
MISJUDGED DISTANCE AND SPEED				1		1	1		1
SELECTED WRONG RUNWAY RELATIVE TO EXISTING WIND									
SUBTOTAL	5		5	31	5	36	36	5	41
** AIRPORTS/AIRWAYS/FACILITIES **									
AIRPORT FACILITIES									
AIRPORT CONDITIONS					1	1		1	1
WET RUNWAY									
AIRWAYS FACILITIES									
SUBTOTAL					1	1		1	1
** WEATHER **									
LOW CEILING					1	1		1	1
RAIN					1	1		1	1
UNFAVORABLE WIND CONDITIONS		1	1		2	2		3	3
TURBULENCE, ASSOCIATED W/CLOUDS, THUNDERSTORMS					1	1		1	1
THUNDERSTORM ACTIVITY					1	1		1	1
SUBTOTAL		1	1		6	6		7	7
** TERRAIN **									
WET, SOFT GROUND					1	1		1	1
SUBTOTAL					1	1		1	1
GRAND TOTAL	5	1	6	31	13	44	36	14	50
** MISCELLANEOUS ACTS, CONDITIONS **									
AIRCRAFT CAME TO REST IN WATER		1	1					1	1
DOWNWIND		2	2		5	5		7	7

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

TABLE 18

BROAD CAUSES/FACTORS
UNDERSHOOT AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 10 TOTAL ACCIDENTS
INVOLVES 2 FATAL ACCIDENTS

BROAD CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*	CAUSE	FACTOR	TOTAL*
PILOT									
PERSONNEL	2 100.00	.00	2 100.00	8 100.00	2 25.00	8 100.00	10 100.00	2 20.00	10 100.00
AIRFRAME	.00	1 50.00	1 50.00	.00	1 12.50	1 12.50	.00	2 20.00	2 20.00
LANDING GEAR	.00	.00	.00	.00	.00	.00	.00	.00	.00
POWERPLANT	.00	.00	.00	.00	.00	.00	.00	.00	.00
SYSTEMS	.00	.00	.00	.00	.00	.00	.00	.00	.00
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	.00	.00	.00	.00	.00
TERRAIN	.00	1 50.00	1 50.00	.00	2 25.00	2 25.00	.00	3 30.00	3 30.00
MISCELLANEOUS	.00	.00	.00	.00	.00	.00	.00	.00	.00
UNDETERMINED	.00	.00	.00	.00	.00	.00	.00	.00	.00
	.00	.00	.00	.00	.00	.00	.00	.00	.00

* 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

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

TABLE 19

DETAILED CAUSES/FACTORS
UNDERSHOOT AS FIRST ACCIDENT TYPE
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

INVOLVES 10 TOTAL ACCIDENTS
INVOLVES 2 FATAL ACCIDENTS

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS			NONFATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** PILOT **									
PILOT IN COMMAND	1		1	1		1	2		2
FAILED TO OBTAIN/MAINTAIN FLYING SPEED				1		1	1		1
INADEQUATE SUPERVISION OF FLIGHT				4		4	4		4
MISJUDGED DISTANCE, SPEED, AND ALTITUDE	1		1	3		3	4		4
MISJUDGED DISTANCE AND ALTITUDE					2	2		2	2
MISUSED OR FAILED TO USE FLAPS	1		1				1		1
SELECTED WRONG RUNWAY RELATIVE TO EXISTING WIND									
SUBTOTAL	3		3	9	2	11	12	2	14
DUAL STUDENT				1		1	1		1
MISJUDGED DISTANCE, SPEED, AND ALTITUDE				1		1	1		1
SUBTOTAL									
** PERSONNEL **									
FLIGHT INSTRUCTOR									
MAINTENANCE, SERVICING, INSPECTION									
OPERATIONAL SUPERVISORY PERSONNEL									
WEATHER PERSONNEL									
TRAFFIC CONTROL PERSONNEL									
AIRPORT SUPERVISORY PERSONNEL		1	1					1	1
IMPROPER MAINTENANCE-AIRPORT FACILITIES									
AIRWAYS FACILITIES PERSONNEL									
PRODUCTION-DESIGN					1	1		1	1
MISCELLANEOUS-PERSONNEL									
DRIVER OF VEHICLE									
THIRD PILOT									
FLIGHT ENGINEER									
DISPATCHING									
SUBTOTAL		1	1		1	1		2	2
** WEATHER **		1	1		2	2		3	3
UNFAVORABLE WIND CONDITIONS									
SUBTOTAL		1	1		2	2		3	3
GRAND TOTAL	3	2	5	10	5	15	13	7	20
** MISCELLANEOUS ACTS, CONDITIONS **					1	1		1	1
PILOT FATIGUE		1	1					1	1
DOWNWIND									

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

TABLE 20

CONDITIONS OF LIGHT BY INJURY INDEX
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE			RECORDS	ACCIDENTS	PERCENT
NONE									
DAWN	1	1	1	1			4	4	.40
DAYLIGHT	368	167	161	196			892	892	90.01
DUSK	24	6	3	7			40	40	4.04
NIGHT	30	8	9	2			49	49	4.94
NIGHT	4		1				5	5	.50
UNKNOWN/NOT REPORTED			1				1	1	.10
OTHER									
RECORDS	427	182	176	206			991		
ACCIDENTS	427	182	176	206				991	
PERCENT	.0	43.1	18.4	17.8	20.8	.0	.0		

TABLE 21

TYPE OF WEATHER CONDITIONS BY INJURY INDEX
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE			RECORDS	ACCIDENTS	PERCENT
NONE									
VFR	407	178	169	202			956	956	96.47
IFR	18	4	3	4			29	29	2.93
BELOW MINIMUMS			1				1	1	.10
UNKNOWN/NOT REPORTED	2		3				5	5	.50
OTHER									
RECORDS	427	182	176	206			991		
ACCIDENTS	427	182	176	206				991	
PERCENT	.0	43.1	18.4	17.8	20.8	.0	.0		

TABLE 22

TERRAIN TYPE BY INJURY INDEX
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS
NONE						
MOUNTAINOUS	29	13	9	5	56	56
HILLY	24	10	8	6	48	48
ROLLING	74	17	15	22	128	128
LEVEL, FLAT	154	52	57	58	321	321
FROZEN						
ROCKY						
SANDY		2		1		
DENSE WITH TREES	30	13	5	7	3	3
I	5			1	55	55
PLOWED	6		2	5	6	6
WATER-LAKES RIVERS, ETC	25	11	9	13	13	13
OTHER	1	2	1		58	58
UNKNOWN/NOT REPORTED	1		1	1	4	4
OTHER					3	3
RECORDS	349	120	107	119	695	
ACCIDENTS	349	120	107	119		695

TABLE 23

EMERGENCY CIRCUMSTANCES BY INJURY INDEX
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

	FATAL	SERIOUS	MINOR	NONE	RECORDS	ACCIDENTS
NONE						
LOW ON FUEL	1		1		2	2
SMOKE IN COCKPIT						
PASSENGER DISTURBANCE						
FALSE FIRE WARNING						
LATERAL CONTROL PROBLEM						
PITCH CONTROL PROBLEM	1				1	1
DIRECTIONAL CONTROL PROBLEM						
ADVERSE/UNFAVORABLE WEATHER	3		4	2	9	9
APPROACHING DARKNESS	1				1	1
SUSPECTED OR KNOWN AIRCRAFT D			1	1	2	2
SUSPECTED MECHANICAL DISCREPA			1	1	2	2
DOOR/PANEL OPEN		1	1		2	2
AIRFRAME BUFFET						
UNUSUAL NOISE		1			1	1
PHYSICAL CONDITION OF PASSG						
FUMES IN CABIN				1	1	1
PROP/ENGINE VIBRATION			1		1	1
UNKNOWN/NOT REPORTED						
OTHER						
RECORDS	6	2	9	5	22	
ACCIDENTS	6	2	9	5		22

TABLE 24

NUMBER OF STALL/SPIN ACCIDENTS VERSUS TOTAL PILOT TIME
BY AIRCRAFT MAKE AND MODEL
STALL/SPIN ACCIDENTS
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

TOTAL PILOT TIME	AERO COMMANDER 500/600 SERIES	AERONCA 11 SERIES	AERONCA 7 SERIES	BEECH D-18/E-18/G-18	BEECH 35/35-33 SERIES	BEECH 95/95-55 SERIES	BEECH A 23 SERIES	BOEING 75 SERIES	CESSNA 120/140	CESSNA 150 SERIES
1 - 25 Hours		2	2						1	15
26 - 50 Hours		2	2				2		2	31
51 - 100 Hours		2	8		1				2	21
101 - 300 Hours		5	17		8	1	6	3	9	29
301 - 500 Hours		2	10	1	2		2	4	5	13
501 - 1000 Hours	2		10		8	5	2	3	3	8
1001 - 3000 Hours	1		15	2	9	5	2	7	2	11
3001 - 5000 Hours	2		5	2	1	4	1	2	1	3
Over - 5000 Hours	1	1	2	2	1	1		8		3
Over - 8000 Hours			1		1		1	3		1
Over -10,000 Hours	1			2		2		4		1
Unknown/Not Reported		2	4		2		1	1	1	4
Stall/Spin Accident Subtotal	7	16	76	9	33	18	17	35	26	140

TABLE 24 (CONT'D)

TOTAL PILOT TIME	CESSNA 170 SERIES	CESSNA 172 SERIES	CESSNA 175 SERIES	CESSNA 180 SERIES	CESSNA 182 SERIES	CESSNA 210 SERIES	CESSNA 310 SERIES	CESSNA 206 SERIES	CESSNA 336/337 SERIES	CESSNA 177
1 - 25 Hours	1	2								
26 - 50 Hours	2	6								3
51 - 100 Hours	2	10								1
101 - 300 Hours	4	16	2	2	6					7
301 - 500 Hours	1	9		3	3					2
501 - 1000 Hours	5	6	2		6					1
1001 - 3000 Hours	3	7		2	1		4	1	3	3
3001 - 5000 Hours			1	2			1	1		
Over - 5000 Hours	1	2			1	1				1
Over - 8000 Hours							1			
Over - 10,000 Hours							2	1	1	
Unknown/Not Reported	1	1					1			
Stall/Spin Accident Subtotal	20	59	5	9	17	1	9	3	4	18

TABLE 24 (CONT'D)

TOTAL PILOT TIME	FORNEY/415 SERIES	LUSCOMBE 8 SERIES	MOONEY M-20 SERIES	NAVION SERIES	PIPER J-3/PA-11 SERIES	PIPER PA-12 SERIES	PIPER PA-18 SERIES	PIPER PA-22 SERIES	PIPER PA -23 SERIES	
1 - 25 Hours	1				1	1		3		
26 - 50 Hours		1	1		7		5	4		
51 - 100 Hours	1	4	3		11	2	4	4		
101 - 300 Hours	3	7	7		16	1	10	6		
301 - 500 Hours	4	3	6		11	4	8	4		
501 - 1000 Hours	2	8	7	4	6	3	17		2	
1001 - 3000 Hours	2	1	4		19		20	5	6	
3001 - 5000 Hours			1	1	2		11			
Over - 5000 Hours		1	2		1		3		2	
Over - 8000 Hours							2			
Over -10,000 Hours					1				1	
Unknown/Not Reported		2	4		6		2	1	1	
Stall/Spin Accident Subtotal	13	27	35	5	81	11	82	27	12	

TABLE 24 (CONT'D)

TOTAL PILOT TIME	PIPER PA-24 SERIES	PIPER PA-25 SERIES	PIPER PA-28 SERIES	PIPER PA-30 SERIES	PIPER PA-32 SERIES	TAYLORCRAFT B SERIES	GLOBE Gc-1 SERIES	STINSON 108 SERIES		
0 - 25 Hours			2			1				
26 - 50 Hours			6		1	3		2		
51 - 100 Hours			9			6				
101 - 300 Hours	5	3	12			9	2	6		
301 - 500 Hours	2	3	6	1	1	2	1	4		
501 - 1000 Hours	4	4	6	5	1	2	1	2		
1001 - 3000 Hours		14	1	6	3	1	4	2		
3001 - 5000 Hours		3	3	3	2			1		
Over - 5000 Hours		4	3	3		1				
Over - 8000 Hours		1	1			1				
Over -10,000 Hours	1	4								
Unknown/Not Reported						1		1		
Stall/Spin Accident Subtotal	12	36	49	18	8	27	8	18		

TABLE 25

NUMBER OF STALL/SPIN ACCIDENTS VERSUS PILOT TIME
IN TYPE BY AIRCRAFT MAKE AND MODEL
SELECTED MAKES AND MODELS OF AIRCRAFT
U. S. GENERAL AVIATION
1967 - 1969

PILOT TIME IN TYPE	AERO COMMANDER 500/600 SERIES	AERONCA 11 SERIES	AERONCA 7 SERIES	BEECH D-18/E-18/G-18	BEECH 35/35-33 SERIES	BEECH 95/95-55 SERIES	BEECH A 23 SERIES	BOEING 75 SERIES	CESSNA 120/140	CESSNA 150 SERIES
0 - 5 Hours		2	5		2	2		3	2	
6 - 25 Hours	1	2	9	1	4	1	6	2	7	31
26 - 50 Hours		3	9		2	1	4	4	2	34
51 - 100 Hours	1	3	16	3	1	3	3	3	4	24
101 - 300 Hours	2	2	15	2	10	6	2	2	6	23
301 - 500 Hours		1	6	3	3	3		2	2	6
501 - 1000 Hours	1		2		4	1	1	4	1	6
1001 - 2000 Hours	2		3					4	1	2
2001 - 3000 Hours					1			2		2
Over 3000 Hours					1			6		
Unknown/Not Reported		3	11		5	1	1	3	1	12
Stall/Spin Accident Stubtotal	7	16	76	9	33	18	17	35	26	140

TABLE 25 (CONT'D)

PILOT TIME IN TYPE	CESSNA 170 SERIES	CESSNA 172 SERIES	CESSNA 175 SERIES	CESSNA 180 SERIES	CESSNA 182 SERIES	CESSNA 210 SERIES	CESSNA 310 SERIES	CESSNA 206 SERIES	CESSNA 336/337 SERIES	CESSNA 177
0 - 5 Hours	1	4			4					
6 - 25 Hours	6	19	1				1		1	10
26 - 50 Hours	3	5	1	1	1			1		3
51 - 100 Hours		10	1	1	5		1			2
101 - 300 Hours	5	12	1	4	1		2	1	2	1
301 - 500 Hours	1	2	1	1	1		2			
501 - 1000 Hours	2	4		1	3				1	1
1001 - 2000 Hours										
2001 - 3000 Hours				1			2			
Over 3000 Hours										
Unknown/Not Reported	2	3			2	1	1	1		1
Stall/Spin Accident Subtotal	20	59	5	9	17	1	9	3	4	18

TABLE 25 (CONT'D)

PILOT TIME IN TYPE	FORNEY/415 SERIES	LUSCOMBE 8 SERIES	MOONEY M-20 SERIES	NAVION SERIES	PIPER PA-12 SERIES	PIPER J-3/PA-11 SERIES	PIPER PA-18 SERIES	PIPER PA-22 SERIES	PIPER PA-23 SERIES	
0 - 5 Hours	2	6				5	3	3		
6 - 25 Hours	2	6	3		2	10	11	5		
26 - 50 Hours	2	5	10	1	1	22	10	5	3	
51 - 100 Hours	2	4	5		5	10	10	6		
101 - 300 Hours	3	1	7	2	1	16	16	4	6	
301 - 500 Hours		2	2		1	9	6	2	1	
501 - 1000 Hours	1		1	1		1	8	1		
1001 - 2000 Hours						1	8			
2001 - 3000 Hours			1				2			
Over 3000 Hours				1					1	
Unknown/Not Reported	1	3	6		1	7	8	1	1	
Stall/Spin Accident Subtotal	13	27	35	5	11	81	82	27	12	

TABLE 25 (CONT'D)

PILOT TIME IN TYPE	PIPER PA-24 SERIES	PIPER PA-25 SERIES	PIPER PA-28 SERIES	PIPER PA-30 SERIES	PIPER PA-32 SERIES	TAYLORCRAFT B SERIES	GLOBE Gc-1 SERIES	STINSON 108 SERIES		
0 - 5 Hours					1		1			
6 - 25 Hours		5	9		2	7	1	4		
26 - 50 Hours	2	3	13	5	1	6	2	3		
51 - 100 Hours	2	3	7	4		6	1	2		
101 - 300 Hours	5	6	11	4	1	5	1	2		
301 - 500 Hours		3	3	2	1			3		
501 - 1000 Hours		11	3	1				2		
1001 - 2000 Hours		5	2	2						
2001 - 3000 Hours										
Over 3000 Hours						1				
Unknown/Not Reported	3		1		2	2	2	2		
Stall/Spin Accident Subtotal	12	36	49	18	8	27	8	18		

APPENDIX C

FAA EXAM-O-GRAM NO. 28 (FACTORS AFFECTING STALL SPEED)

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

VFR PILOT EXAM-O-GRAM* NO. 28

FACTORS AFFECTING STALL SPEED

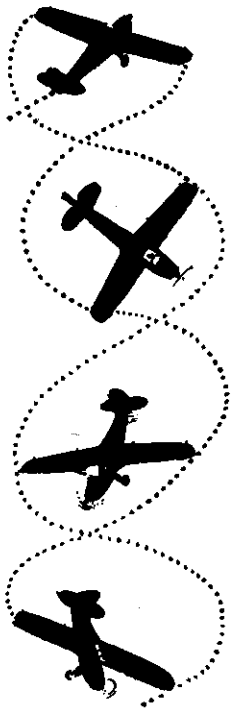

FIG. 1

A recent report indicates that approximately 80% of all accidents are pilot caused. The major cause of fatal accidents is listed as "failed to maintain airspeed (or flying speed) resulting in a stall." Although many of these stalls may have occurred under the stress and duress of other problems such as disorientation during limited visibility or at night, improper division of attention, etc., a review of statistical analyses of written examinations indicates a lack of knowledge and understanding of the various factors that can cause or contribute to a stall. This Exam-O-Gram discusses some of the more important, ever-present factors of which the pilot must have an understanding so that he will instinctively avoid or compensate for situations, conditions, and attitudes which may lead to a stall--even under the stress and duress of additional problems he may encounter in flight.

WHAT CAUSES AN AIRPLANE TO STALL? All stalls are caused by exceeding the critical angle of attack. Knowing this particular fact does not necessarily help the pilot. What is more important to the pilot is to know what factors are likely to contribute to or cause this angle of attack to be exceeded.

IS IT NECESSARY FOR THE AIRPLANE TO HAVE A RELATIVELY LOW AIRSPEED IN ORDER FOR IT TO STALL? No! An airplane can be stalled at any airspeed. All that is necessary is to exceed the critical angle of attack. This can be done at any airspeed if the pilot applies abrupt or excessive back pressure on the elevator control. A stall that occurs at a relatively high speed is referred to as an accelerated or high speed stall.

IS IT NECESSARY FOR THE AIRPLANE TO HAVE A RELATIVELY HIGH PITCH ATTITUDE IN ORDER FOR IT TO STALL? No! An airplane can be stalled in any attitude. Repeating again the statement made above - all that is necessary is to exceed the critical angle of attack. This can occur in any attitude by application of abrupt or excessive back pressure on the elevator control.

DOES WEIGHT AFFECT THE STALLING SPEED? Yes! As the weight of the airplane is increased, the stall speed increases. Due to the greater weight, a higher angle of attack must be maintained to produce the additional lift to support the additional weight in flight. Therefore, the critical angle of attack will be reached at a higher airspeed when loaded to maximum gross weight than when flying solo with no baggage. (See Exam-O-Gram No. 13.)

DOES THE CENTER-OF-GRAVITY LOCATION (WEIGHT DISTRIBUTION) AFFECT STALL SPEED? Yes! The farther forward the center of gravity, the higher the stalling speed. The farther aft the center of gravity, the lower the stalling speed. (See Exam-O-Gram No. 13.)

DOES THIS MEAN THAT THE WEIGHT SHOULD BE DISTRIBUTED IN THE AIRPLANE SO THAT THE CG IS AS FAR TO THE REAR AS POSSIBLE? No! This may present problems with stability that will far outweigh any advantages obtained by the decrease in stall speed. (See Exam-O-Gram No. 13.)

* Exam-O-Grams are non-directive in nature and are issued solely as an information service to individuals interested in Airman Written Examinations.

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DO FLAPS AFFECT STALLING SPEED? Yes! The use of flaps reduces stalling speed. The Stall Speed Chart (Figure 2) excerpted from an airplane flight manual illustrates this fact. This also can be readily verified by checking the color coding on any airspeed indicator. The lower airspeed limit of the white arc (power-off stalling speed with gear and flaps in the landing configuration) is less than the lower airspeed limit of the green arc (power-off stalling speed in the clean configuration). (See EXAM-O-GRAM No. 8.) This fact is important to the pilot in that when making no-flap landings, a higher indicated airspeed should be maintained than when landing with flaps. The manufacturers' recommendations should be adhered to as to approach speeds with various configurations.

STALL SPEED, POWER OFF

Gross Weight 3000 lbs. CONFIGURATION	ANGLE OF BANK 0°	20°	40°	60°
GEAR & FLAPS UP	65	67	74	92
GEAR DOWN, FLAPS 20°	61	63	70	86
GEAR DOWN, FLAPS 40°	60	62	69	85

SPEEDS ARE MPH, TIAS

FIG. 2. (Note: TIAS identical with CAS)

DOES AN ACCUMULATION OF FROST, SNOW, OR ICE ON THE WINGS AFFECT STALLING SPEED? Yes! Even a light accumulation of frost, snow, or ice on the wings can cause a significant increase in stalling speed. It can increase it so much that the airplane is unable to take off. The accumulation disrupts the smooth flow of air over the wing thus decreasing the lift it produces. To make up for the lost lift, a higher angle of attack must be used or a higher speed must be attained on the takeoff roll. The runway may not be long enough to attain the necessary speed and even though the airplane may become airborne, it could be so close to the stall speed that it would not be possible to maintain flight once the airplane climbs above the comparatively shallow zone where ground effect prevails. DO NOT TAKE OFF UNTIL ALL FROST, SNOW, OR ICE HAS MELTED OR BEEN REMOVED FROM THE AIRPLANE.

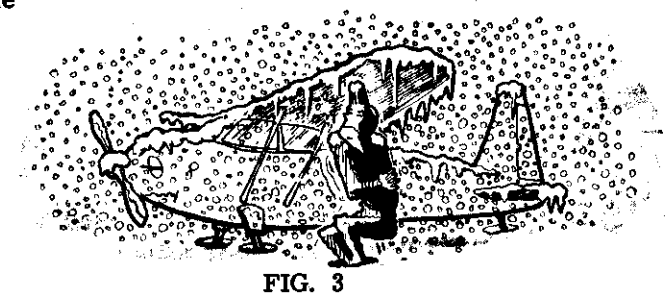


FIG. 3

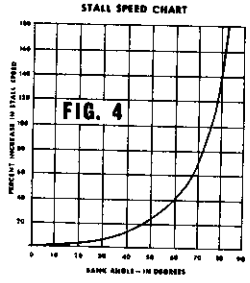
DOES AN INCREASE IN ALTITUDE AFFECT THE INDICATED AIRSPEED AT WHICH AN AIRPLANE STALLS? An increase in altitude has no effect on the indicated airspeed at which an airplane stalls at altitudes normally used by general aviation aircraft. That is, for all practical purposes, the indicated stalling speed remains the same regardless of altitude in this range. This fact is important to the pilot in that the same indicated airspeed should be maintained during the landing approach regardless of the elevation or the density altitude at the airport of landing. (Follow the manufacturer's recommendations in this regard.) If higher than normal approach airspeed is used, a longer landing distance will be required.

DOES AN INCREASE IN ALTITUDE AFFECT THE TRUE AIRSPEED AT WHICH AN AIRPLANE STALLS? Since true airspeed normally increases as altitude increases (for a given indicated airspeed), then true airspeed at which an airplane stalls generally increases with an increase in altitude. Under non-standard conditions (temperature warmer than standard) there is an additional increase in true airspeed above the indicated airspeed.

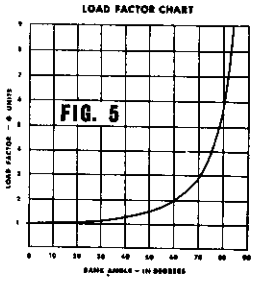
OF WHAT SIGNIFICANCE IS THIS TO THE PILOT? It is significant in that when landing at higher elevations or under higher density altitudes, he is operating at higher true airspeeds (and therefore higher groundspeeds) throughout the approach, touchdown, and landing roll. This results in a greater distance to clear obstacles during the approach, a longer ground roll, and consequently, the need for a longer runway. If, in addition, the pilot is operating under the misconception that a higher than normal indicated airspeed should be used under these conditions, the situation is further compounded due to the additional increase in groundspeed. (See EXAM-O-GRAM No. 26.)

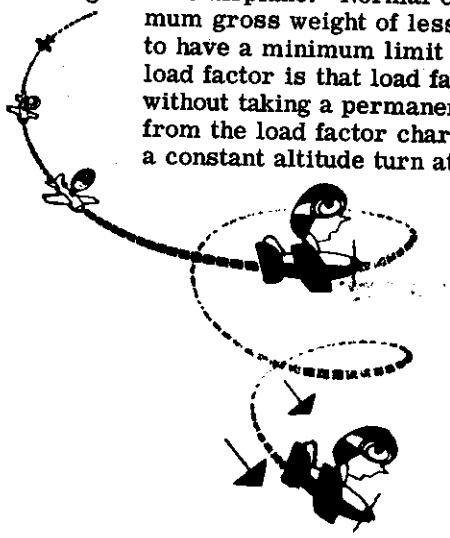
DOES TURBULENCE AFFECT STALLING SPEED? Yes! Turbulence can cause a large increase in stalling speed. Encountering an upward vertical gust causes an abrupt change in relative wind. This results in an equally abrupt increase in angle of attack which could result in a stall. This fact is important to the pilot in that when making an approach under turbulent conditions, a higher than normal approach speed should be maintained. Also, in moderate or greater turbulence, an airplane should not be flown above maneuvering speed. (See EXAM-O-GRAM No. 8.) At the same time, it should not be flown too far below maneuvering speed since a sudden severe vertical gust may cause an inadvertent stall due to the higher angle of attack at which it will already be flying..

DOES ANGLE OF BANK AFFECT STALLING SPEED? Yes! As the angle of bank increases in a constant altitude turn, the stalling speed increases. This is easily seen from the STALL SPEED CHARTS (Figs. 2 and 4) which show the increase in stall speed as the angle of bank increases--Fig. 4 in terms of percent, Fig. 2 the actual values for one airplane. At a 60° bank stalling speed is 40% greater than in straight-and-level flight (25-27 mph for the specific example.) At angles of bank above 60°, stall speed increases very rapidly, and at approximately 75° it is doubled with respect to straight-and-level stall speed (Fig. 4).



DOES LOAD FACTOR AFFECT STALLING SPEED? Yes! As the load factor increases, stalling speed increases. When the load factor is high, stalling speed is high. A comparison of the two charts (Figs. 4 and 5) should easily show this relationship. Load factor is the ratio of the load supported by the wings to the actual weight of the airplane and its contents. At a load factor of 2, the wings support twice the weight of the airplane; at a load factor of 4, they support four times the weight of the airplane. Normal category airplanes with a maximum gross weight of less than 4,000 pounds are required to have a minimum limit load factor of 3.8. (The limit load factor is that load factor an airplane can sustain without taking a permanent set in the structure.) Note from the load factor chart (Fig. 5) that this minimum limit load factor is attained in a constant altitude turn at a bank of approximately 75°. Also note from the stall speed chart (Fig. 4) that at this angle of bank, the stall speed is twice as great as in straight-and-level flight. There are two reasons then why excessively steep banks should be avoided--an airplane will stall at a much higher airspeed and the limit load factor can be exceeded. The danger can be compounded when the nose gets down in a steep turn if the pilot attempts to raise it to the level flight attitude without shallowing the bank since the load factor may be increased even more. This is the situation as it generally exists when, due to disorientation, the pilot enters a diving spiral (often referred to as the "graveyard spiral") and attempts to recover with elevator pressure alone.





WHAT FACTORS CAUSE AN INCREASE IN LOAD FACTOR? Any maneuvering of the airplane that produces an increase in centrifugal force will cause an increase in load factor. Turning the airplane or pulling out of a dive are examples of maneuvering that will increase the centrifugal force and thus produce an increase in load factor. When you have a combination of turning and pulling out of a dive, such as recovering from a diving spiral, you are, in effect, placing yourself in double jeopardy. This is why you must avoid highspeed diving spirals or if you accidentally get into one--be careful how you recover. Turbulence can also produce large load factors. This is why an airplane should be slowed to maneuvering speed or below when encountering moderate or greater turbulence.

CAN THE PILOT RECOGNIZE WHEN THERE IS AN INCREASE IN LOAD FACTOR? Yes! He can recognize it by the feeling of increased body weight or the feeling that he is being forced down into the seat--the greater the load factor the greater this feeling of increased weight or of being forced down in the seat (Figs. 6 and 7). It is the same feeling one has when riding the roller coaster at the bottom of a dip or going around a banked curve. This feeling of increased body weight is important to the pilot because it should, if it becomes excessive, have the immediate effect of a red flag being waved in his face to warn him that the airplane will now stall at a higher airspeed or that the limit load factor can be exceeded, resulting in structural failure.

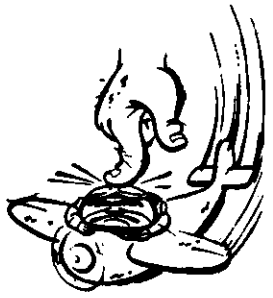


FIG. 6

DOES SPEED AFFECT LOAD FACTOR? Speed does not, in itself, affect load factor. However, it has a pronounced effect on how much of an increase in load factor can be produced by strong vertical gusts, or by the pilot through abrupt or excessive application of back pressure on the elevator control. This is why airspeed should be reduced to maneuvering speed or below if moderate or greater turbulence is encountered. At maneuvering speed or below, the airplane is stressed to handle any vertical gust that normally will be encountered. Also, below this speed, the pilot can make abrupt full deflection of the elevator control and not exceed the maximum load factor for which the airplane is stressed. However, it should be noted that the reason this is possible is because the airplane will stall, thus relieving the load factor. At airspeeds above maneuvering speed, abrupt full deflection of the elevator control or strong vertical gusts can cause the limit load factor to be exceeded. As airspeed continues to increase above maneuvering speed, the limit load factor can be exceeded with less and less turbulence or abrupt use or deflection of the controls.

WHAT IS THE RELATIONSHIP BETWEEN A HIGH SPEED (ACCELERATED) STALL AND LOAD FACTOR? The higher the airspeed when an airplane is stalled, the greater the load factor. When an airplane stalls at a slow airspeed, the load factor will be very little more than one. When stalled at an airspeed twice as great as the normal stall speed, the limit load factor for normal category airplanes probably will be exceeded. This fact can be determined from the stall speed (Fig. 4) and load factor (Fig. 5) charts. See also discussion of "Does Load Factor Affect Stalling Speed" (page 3).

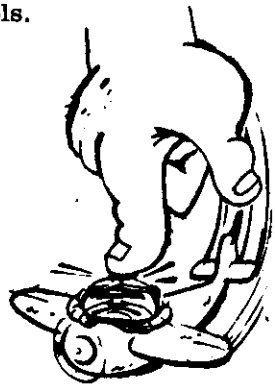


FIG. 7

Prepared by FAA Flight Standards Service
Operations Airman Examination Section
5300 South Portland Avenue
Oklahoma City, Oklahoma 73119