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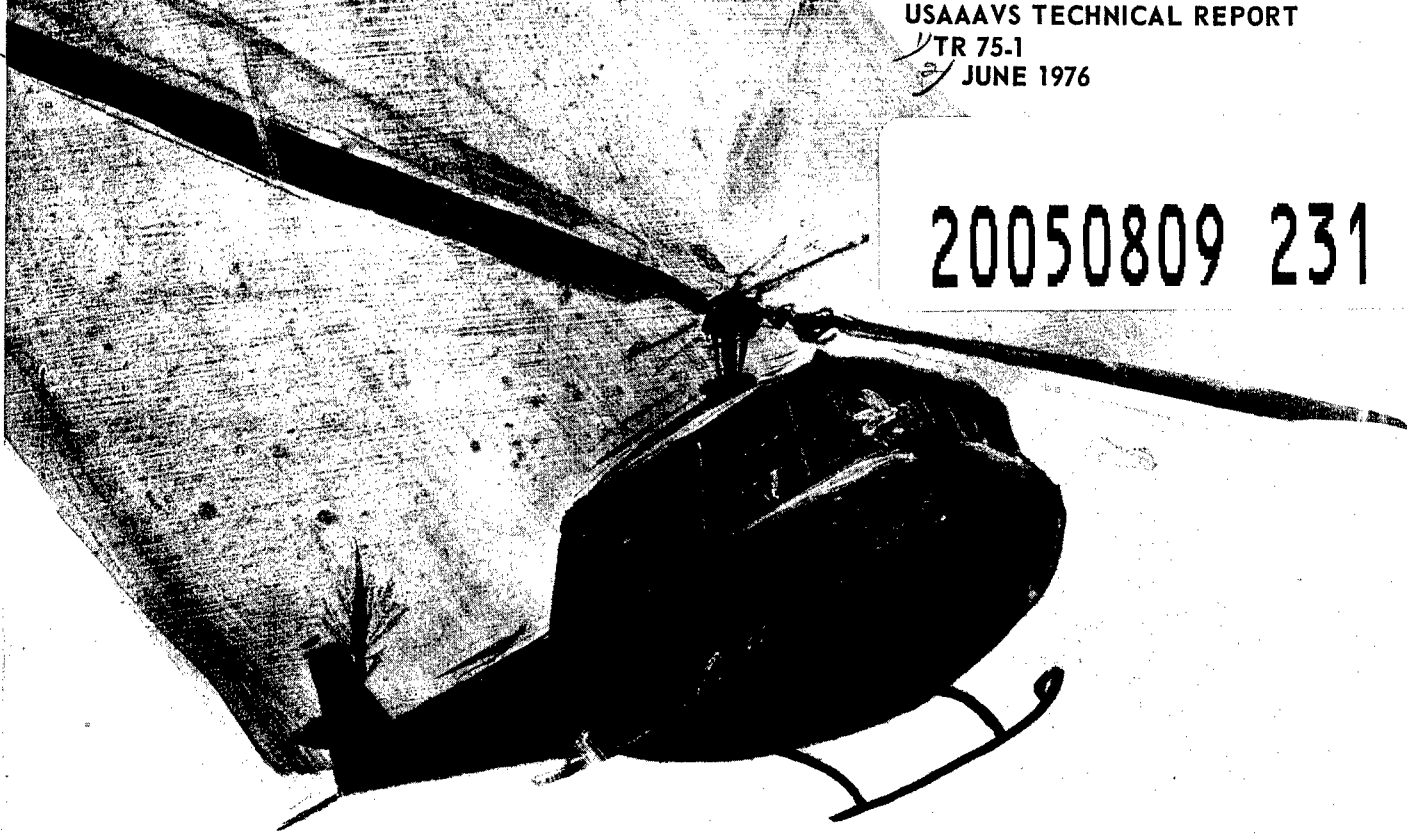
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FORT RUCKER, ALABAMA 36362

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AUTOROTATIONS: a survey of Army aviator opinion

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**AUTOROTATIONS:
A SURVEY OF ARMY AVIATOR OPINION**

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ACKNOWLEDGEMENTS

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The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The need to practice touchdown autorotations has generated considerable controversy. This report analyzes the responses of 7,602 Army aviators in 1971 concerning their opinions about the necessity for practicing touchdown autorotations. Results indicate participating Army aviators strongly favor continuing a policy practicing touchdown autorotations. Validity of this opinion was tested by comparison of aviator responses across a wide range of background and experience. This opinion is more extreme for participating aviators who are exposed more to situations that may require (cont'd)		

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BLOCK 20. ABSTRACT (cont'd)

execution of an emergency autorotation, i.e., rotary wing only qualified aviators flying single engine aircraft a high number of hours annually. The strength and consistent nature of the aviators' responses indicate this opinion is unlikely to change in the near future.

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FOREWORD

The position taken by 7,602 Army rotary wing (R/W) aviators included in this study strongly supports the requirement to practice autorotations, particularly to touchdown. Their opinion was consistent. Little or no change in their opinion occurred when analyzed in terms of total flight time, number of autorotations made because of loss of total or partial power, or when they did or did not have an accident practicing touchdown autorotations.

The consistency and strength of their opinion is intriguing. Because of safety-of-flight implications, it is important to understand why their opinion was so strong.

The most apparent explanation is, before earning their wings, every R/W aviator executes more than 200 autorotations and practices the maneuver periodically throughout his career. Because of the emphasis on autorotations in training, Army R/W aviators are conditioned to the requirement. The presence of a climate conducive to conditioning is undeniable.

However, the consistency and strength of opinion expressed would make it unwise not to consider a more fundamental reason. Every R/W aviator is constantly aware of the unacceptable alternatives to an unsuccessful autorotation. R/W aviators also know the margin for error during an autorotation is indeed small. They believe practice enlarges the margin in their favor.

In the interest of safety of flight, it is necessary to have an alternative. Such an alternative is the program implemented by USAAAVS more than a decade ago. Its objective was to minimize the hazards and risks of practicing autorotations. This program, implemented through a series of Safety-of-Flight Advisory Messages, has progressively developed an outline of the conditions and circumstances under which autorotations are practiced. In recognition that the program has effectively minimized the risks while still providing the training R/W aviators feel they need, the Department of the Army has released Message R031310Z Jan 75, which establishes Army policy concerning practice touchdown autorotations.

NORMAN W. PAULSON
Colonel, TC
Commanding

SUMMARY

Problem. Autorotation is heavily relied on as a rotary wing (R/W) emergency maneuver. Previous studies have implied skills developed and maintained during practice of this maneuver result in a reduction of error in an actual emergency. Because of the large number of accidents occurring while touchdown autorotations are being practiced, conditions under which such practice is permitted have become more stringent. With increasing restrictions on practice of touchdown autorotations, the question that ultimately arises is, "What would happen if such practice was terminated?" In other words, what is the accident risk of possible reductions in emergency autorotation proficiency as a tradeoff for no accidents in practicing touchdown autorotations?

Approach. A questionnaire was developed to solicit opinions regarding this tradeoff question. The questionnaire was distributed with the 1971 Army Aviation Annual Written Examination and was completed by 7,602 aviators.

Results. Responses of the participating aviators indicated they definitely favored practicing touchdown autorotations. The only statistically significant difference between aviators was in the degree to which they favored such practice. Aviators flying single-engine R/W aircraft more strongly favored this practice than those flying multi-engine R/W aircraft. Aviators rated only

in R/W aircraft (RWO) gave stronger favoring responses than dual rated (DR) aviators. Those flying more than 200 hours during the past 12 months more strongly favored this practice than those flying less than 200 hours. Those who were fully confident in completing an emergency autorotation more strongly favored this practice than those less than fully confident. Aviator responses did not differ in degree or direction as a function of total flight time, mishap experience, or component.

The finding that aviators strongly favor practicing touchdown autorotations results perhaps from the emphasis placed on such practice in initial entry flight training and operational experience. Differences in degree of favoring such practice appears to be a function of the aviators' exposure to situations that may require use of autorotations as an emergency procedure.

Conclusions. Any action to eliminate practice touchdown autorotations would have met considerable resistance by Army aviators.

The most acceptable way of minimizing mishaps during practice autorotations is first to provide multi-engine R/W aircraft and subsequently limit practice.

The consistent nature of responses indicates the opinions are not likely to change in the near future. The one event most likely to effect an opinion change would be an increase of multi-engine R/W aircraft in the Army inventory.

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AUTOROTATION: A SURVEY OF ARMY AVIATOR OPINION

INTRODUCTION

During the period 1 July 1970 to 30 June 1974 4,107 Army aviation mishaps occurred. From the time the emergency was first indicated until the termination of the flight, an autorotation maneuver was used in 1,049 of these mishaps. This indicates that autorotation is heavily relied on as an emergency maneuver.

Ricketson, Johnson, Branham, and Dean (1973) reported that 35 percent of all Army R/W mishaps which involved pilot error also involved the landing phase of autorotation. This implies that proficiency in the maneuver is required to reduce pilot error. In single-engine helicopters, the Army aviator has no alternative in total power-loss emergencies but to rely on this maneuver. Proficiency developed and maintained by practicing touchdown autorotations prepares him to cope with a power-loss emergency.

Army policy assumes that practicing touchdown autorotations provides aviators with skills and confidence which improve performance in a real emergency. Zeller (1958) concurs with that policy by suggesting emergency corrective actions should be practiced to a degree compatible with accurate accomplishment during a real emergency. Zeller's logic is that by practicing an emergency maneuver the pilot will gain confidence in his ability to cope with an actual emergency.

Zeller's logic and Army policy are both sound. However, Safety-of-Flight Advisory Message AIG 7401, 6 April 1973, points out a serious problem concerning practice autorotations. During the period 1 July 1969 through 31 December 1972, 491 mishaps occurred during practice touchdown autorotations, resulting in three fatalities, 48 injuries, and considerable aircraft damage cost. The question arises as to whether the cure, i.e., practice touchdown autorotations, is worse than the problem, i.e., maintaining autorotation skills required in an emergency. To minimize risk during practice touchdown autorotations, conditions under which such practice is permitted have tended to become more stringent. Inevitably the question evolves, "Why practice touchdown autorotations at all?"

To answer this question, it would be necessary to do the following: First, one would have to determine whether skill acquired and maintained by practicing touchdown autorotations results in savings in actual emergencies. Second, determine if this amount of savings is sufficient to justify losses incurred during such practice. Unfortunately, an objective method for conclusively measuring such savings would be impractical to implement. The question of whether or not to practice touchdown autorotations demands attention. This question is not amenable to objective methods of study. It was decided that analysis of a large number of Army

aviators' opinions might provide information allowing the optimum solution to the problem. Research of this nature would provide insight into pilots' perceived needs and reactions to practice touchdown autorotations. Therefore, a study was conducted to determine Army aviator opinion concerning autorotation practices and policies in light of their experience.

It should be noted that aviator "opinion" means a proportion of aviators surveyed answered the same question in the same way. A problem arises in determining whether this opinion is valid. For example, aviator opinion about the need for practicing touchdown autorotations may be influenced by what they are taught as student aviators instead of a "pure" measure of experience. Anastasi (1968) suggests attitudes and opinions may be validated by comparison of answers made by different subgroups. Consistency of opinion across groups with a wide range of experience and background is indicative of opinion validity.

METHOD

Participating Aviators. There were 7,602 R/W and dual rated (DR) Army aviators who participated in this survey. This represented a 20 percent sample of Army aviators. At Appendix A are survey findings relative to background data of participants.

Materials. The instrument used for this survey was the 1971 Aviation Accident Prevention Questionnaire. A copy of the questionnaire is at Appendix B. Questions 1 through 23 requested military and flight activity background of participants. Questions 45 through 55 solicited the participant opinion concerning autorotations.

Survey. The Aviation Accident Prevention Questionnaire was distributed with the 1971 Army Aviation Annual Written Examination. The questionnaire answer sheets were completed anonymously and returned to USAAVS.

RESULTS

Table 1 shows the percentage distribution of participating aviator responses to each item regarding practice touchdown autorotations.

Questions 45 through 52 are directly concerned with the need for practice touchdown autorotations. Disagreement with items 45, 46, 48, 51, and 52 indicates opinion favoring practice autorotations to touchdown. Disagreement

with items 47, 49, and 50 indicates opinion opposing practice autorotations to touchdown. Agreement indicates opinion favoring practice autorotations to touchdown. Figure 1 shows the distribution of responses for all participating aviators from strongly opposing touchdown autorotations to strongly favoring touchdown autorotations.

Participating aviator responses were grouped on the basis of several background variables. A statistical comparison of the response distribution within these groups was made based upon the Congruency Factor Quotient (Cohen & Forthman, 1972). Response distributions within four groups were significantly different ($p \leq .05$) indicating the difference in distribution was significantly greater than expected by chance alone. The response distribution for these groups was plotted for comparison in the form of histograms.

Figure 2 compares responses of participating aviators flying multi-engine R/W aircraft with those flying single-engine R/W aircraft. Response distribution was significantly different at the .05 level, Alpha Index (AI) = 1.563.

Figure 3 compares responses of participating aviators flying only R/W aircraft with DR participating aviators. Response distribution was significantly different at the .01 level, AI = 5.996.

Figure 4 compares responses of participating aviators flying R/W aircraft less than 200 hours in the past 12 months with those flying more than 200 hours. Response distribution was significantly different at the .01 level, AI = 4.697.

A comparison of participating aviator responses according to their reported confidence to perform an emergency autorotation in a hypothetical situation was made in Figure 5. Responses concerning autorotations by participating aviators who were fully confident they could successfully complete an emergency autorotation were compared with responses of participating aviators who were less than fully confident in completing the emergency autorotation. Response distribution was significantly different at the .01 level, AI = 2.604.

No significant differences were found for response distributions based on total flight time, mishap experience, and component, i.e., Active Army, Army Reserve, National Guard.

**TABLE 1.—Percentage Distribution of Aviator Responses to
1971 Aviation Accident Prevention Questionnaire**

Item	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I. Disagreement indicates opinion favoring practice autorotations to touchdown					
45. Practice autorotations flown to touchdown are unnecessary risk.	5.36	5.20	2.89	24.68	61.87
46. Proficiency in autorotation landings can be accomplished by terminating practice autorotations with a full power recovery at 100 feet above ground level.	2.33	3.85	2.49	25.01	66.32
48. Practice autorotations flown to touchdown give aviators a false sense of their ability to handle a real emergency.	2.31	3.27	4.51	50.63	39.30
51. Aviators who demonstrate they can make a power recovery practice autorotation (full power restored at 100 feet agl) are proficient enough to handle an emergency autorotation to prevent major damage to the aircraft.	1.37	7.05	13.58	44.01	33.98
52. Aviators who demonstrate they can make a power recovery practice autorotation (full power restored at 100 feet agl) are proficient enough to handle an emergency autorotation to allow the crew to walk away.	1.94	21.24	28.17	33.23	15.42
II. Disagreement indicates opinion opposing practice autorotations to touchdown					
47. The main purpose of flying practice autorotations to touchdown is to give aviators needed confidence.	38.28	37.87	4.58	15.11	4.17
49. Practice autorotations flown to touchdown should be included in transition training.	72.20	24.93	1.00	1.12	.75
50. Practice autorotations flown to touchdown should be included in refresher training, e.g., training of aviators coming off ground duty.	71.51	24.02	1.53	1.99	.96
III. Opinion pertaining to who should determine necessity of practice touchdown autorotations					
53. During proficiency training flights, it should be left to the IP to determine whether his trainee needs to fly one or more autorotations to touchdown.	19.05	48.95	6.46	19.93	5.61
54. Whether practice autorotation landings will be flown to touchdown is the prerogative of the commander.	4.46	20.73	10.02	40.56	24.23
55. An aviator knows when he needs to practice autorotation landings to touchdown.	17.54	45.53	10.53	22.53	3.87

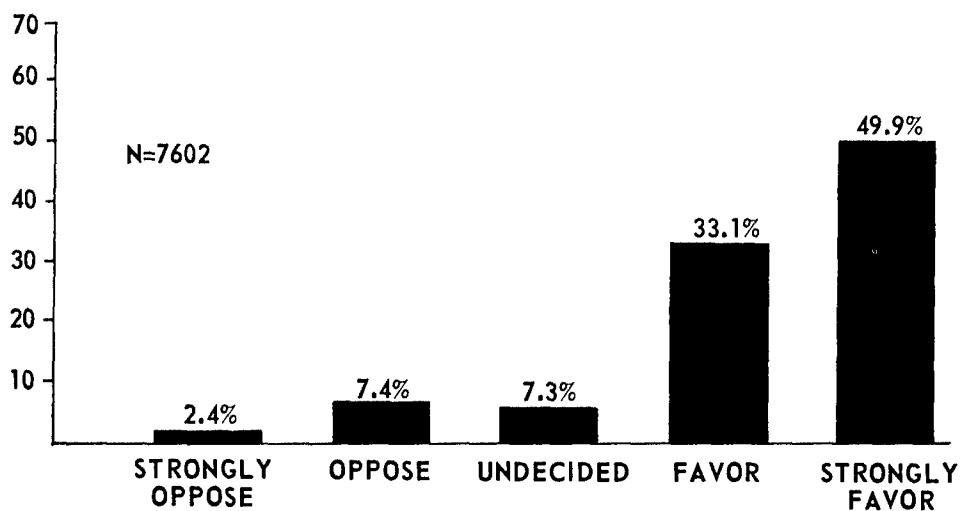


FIGURE 1.—Distribution of Aviator Opinion Concerning Practice Touchdown Autorotation

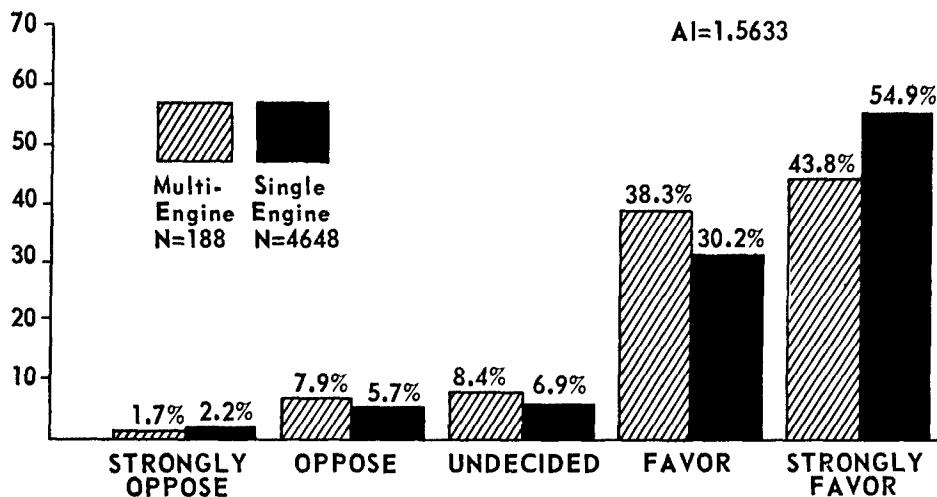


FIGURE 2.—Opinions of Multi-Engine and Single Engine R/W Aviators Regarding Desirability of Practicing Touchdown Autorotations

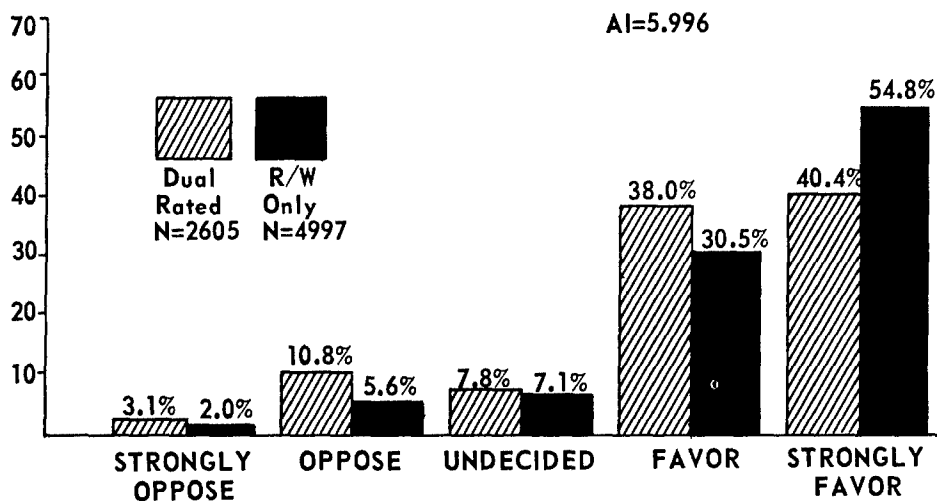


FIGURE 3.—Opinions of Dual Rated and Rotary Wing Only Rated Aviators Regarding Desirability of Practicing Touchdown Autorotations

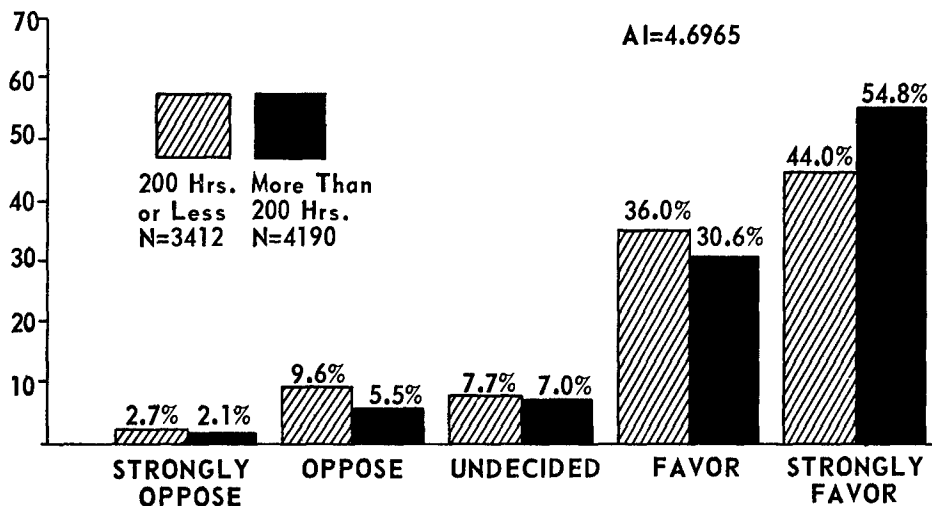


FIGURE 4.—Opinions of Aviators Regarding Desirability of Practicing Touchdown Autorotation Based on R/W Flight Time During Past 12 Months

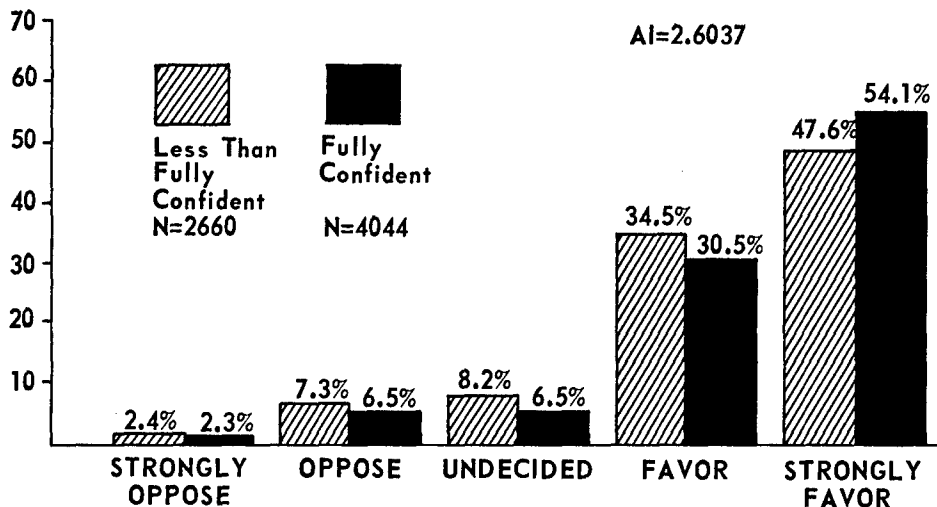


FIGURE 5.—Opinions of Aviators Regarding Desirability of Practicing Touchdown Autorotations Based on Confidence in a Hypothetical Emergency Situation

DISCUSSION

The responses of the participating aviators strongly favored practicing touchdown autorotations. The only differences between different groups of participating aviators were in degree, not direction. Consistency of their opinion across groups reflects a valid opinion.

Participating aviators felt risks involved in practice touchdown autorotations are necessary and that power recovery autorotations are not a suitable alternative. Responses to items 46, 51, and 52 (Table 1) indicate the participating aviators' opinions regarding the substitution of power recovery autorotations for practice touchdown autorotations. Ninety-one percent of the participating aviators disagreed that proficiency

could be maintained by practicing only power recovery autorotations. Only 8 percent agreed that enough proficiency could be maintained using power recovery autorotations to prevent major damage to the aircraft. In situations requiring only the proficiency needed for the crew to walk away, aviators tended to respond that power recovery autorotations might provide an alternative.

Differences in flight background produced differences in the degree to which participating aviators favored practicing touchdown autorotations. Participating aviators flying single-engine R/W aircraft were more extreme in their opinion than those flying multi-engine R/W aircraft (Figure 2). A reasonable explanation

for this difference is that participating aviators who flew multi-engine R/W aircraft recognized a decreased risk of total power loss. Hence, they felt less need for practice.

R/W participating aviators tended to be more extreme in their opinion than DR participating aviators (Figure 3). DR participating aviators have less exposure to situations requiring emergency autorotation because their flight time is divided between R/W and fixed wing aircraft.

This lack of exposure also explains why participating aviators who flew less than 200 R/W hours in the past 12 months were less extreme in their opinion than those flying over 200 hours (Figure 4).

The comparison of participating aviators fully confident in their ability to autorotate with those less than fully confident showed the fully confident participating aviators were more extreme in their opinion. This suggests the fully confident participating aviators were less concerned about risks involved in practice touchdown autorotations.

Participating aviators with total flight time of less than 1,400 hours versus those with more than 1,400 hours were compared. Total flight experience seems to have no effect on the participating aviator's opinion regarding practice touchdown autorotations.

A comparison of participating aviators who had executed an emergency autorotation due to total loss of engine power versus those who had not, revealed no difference in degree of opinion about practicing touchdown autorotations. The same results were obtained from a comparison of

those executing an emergency autorotation due to a partial loss of engine power and those who had not.

Participating aviators who had experienced an accident while practicing autorotations did not differ in opinion from those who had not.

CONCLUSIONS

Results reveal a profile for the participating aviator strongly in favor of practice touchdown autorotations. He is qualified in R/W aircraft only and has flown a large number of hours in single-engine R/W aircraft. He is confident of performing emergency autorotations successfully but firmly believes he must be allowed to continue such practice to maintain proficiency.

In view of these findings, action to eliminate practice touchdown autorotations would meet considerable resistance by Army aviators.

Apparently, the most acceptable way of minimizing mishaps during practice touchdown autorotations is first to provide multi-engine R/W aircraft and subsequently limit practice. This solution appears most acceptable in view of the responses of the participating aviators. Results suggest aviators predominantly flying multi-engine R/W aircraft recognized a decreased risk of total power loss. Hence, they tended to feel less need to practice touchdown autorotations.

Comparisons between groups and the consistent nature of opinions indicate these opinions are not likely to change in the near future. The one event most likely to cause an opinion change would be a significant increase of multi-engine R/W aircraft in the Army inventory.

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APPENDIX A

BACKGROUND DATA ON PARTICIPATING AVIATORS IN THE 1971 AVIATION ACCIDENT PREVENTION QUESTIONNAIRE

1. Distribution of aviators by service component:
 - a. 5,946 (78%) Active Army aviators
 - b. 379 (5%) Army Reserve aviators
 - c. 1,168 (15%) National Guard aviators
 - d. 109 (1%) civilian government employees
2. Emergency autorotations due to loss of partial engine power:
 - a. Rate—51.8/100,000 flying hours (aviator, not aircraft, flying hours)
 - b. Mean—0.69 per aviator
 - c. At 1,800-hour level the mean is 0.75/aviator
 - d. At 3,400+ hours the mean is 1.7/aviator
 - e. 90% occurred over terrain suitable to land without damage
 - f. 65% reported no autorotations due to this cause
3. Emergency autorotations due to loss of all engine power:
 - a. Rate—61.8/100,000 flying hours
 - b. Mean—0.83 (20% greater than the mean partial power loss above)
 - c. At 1,800 hours level the mean is 0.9/aviator
 - d. At 3,400+ hours the mean is 2.0/aviator
 - e. 84% occurred over terrain suitable for landing without damage
 - f. 61% reported no autorotations due to this cause
4. Practice autorotations which ended in an accident:
 - a. Rate—5.2/100,000 flying hours
 - b. Mean—0.07/aviator
 - c. At 1,800 hours level the mean is 0.08/aviator
 - d. At 3,400+ hours the mean is .15/aviator
 - e. 94% reported no accidents during practice autorotation
5. Confidence in ability to execute total power loss, straight ahead, maximum gross autorotation when at traffic pattern altitude:
 - a. 60% were 100% confident
 - b. Another 26% were 75% confident
6. Confidence as a passenger when fellow aviators are at the controls during an engine-out autorotation:
 - a. 24% had confidence in 100% of their fellow aviators
 - b. 26% had confidence in 75% of their fellow aviators
 - c. 24% had confidence in 50% of their fellow aviators



APPENDIX B

DEPARTMENT OF THE ARMY
UNITED STATES ARMY BOARD FOR AVIATION ACCIDENT RESEARCH
FORT RUCKER, ALABAMA 36360

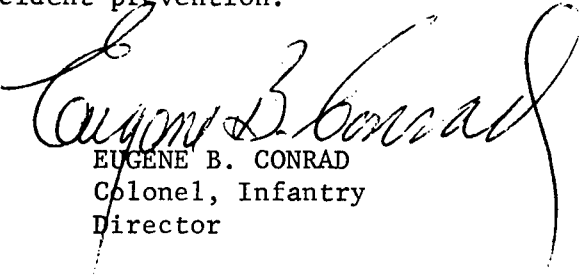
BAAR-TR&A

SUBJECT: Aviation Accident Prevention Questionnaire

Examiners and Army Aviator Examinees

1. Chapter 3, Paragraph 3-1i of AR 95-5, Change 2, 1 January 1971, provides for the gathering of data by USABAAR for the purpose of aircraft accident prevention.
2. Under the provisions of the reference in paragraph 1 above and through the cooperation of the United States Army Aviation School, the attached questionnaire is to be distributed with the Army Aviation Annual Written Examination. Examiners are requested to complete the questionnaire themselves and to collect all answer sheets from the examinees. The answer sheets are to be mailed to Director, USABAAR, ATTN: Chief, TR&A Department.
3. The attached questionnaire is the first attempt to gather information from the entire population of Army aviators. Your cooperation in completing the questionnaire will enable USABAAR to identify certain problem areas and to consolidate world-wide Army aviator opinion in these areas.
4. USABAAR appreciates this contribution from all Army aviators. The information will be an extremely valuable adjunct to the vitally important task of aircraft accident prevention.

1 Incl
as


EUGENE B. CONRAD
Colonel, Infantry
Director

U S A B A A R

ACCIDENT PREVENTION SURVEY - 1971

1. Select one of the following choices that indicates your current duty status.
 - a. Active Army (includes all active duty components, i.e., Regular Army, reservists on active duty and national guardsmen on active duty)
 - b. Army Reserve (active reserve only)
 - c. Army National Guard
 - d. Civilian government employee
 - e. Other

2. During the past 12 months, in which of the following assignments did you serve the longest time?
 - a. Aviation TOE position
 - b. Aviation TD position
 - c. Staff position (aviation)
 - d. Staff position (non-aviation)
 - e. Student (except for flight training)
 - f. Student (flight training)
 - g. Other ground assignment
 - h. Civilian government employee

3. How many hours did you fly fixed wing aircraft (F/W) (military time only) during the past 12 months?

a. Not F/W rated	d. 101-200 hrs	g. 601-800 hrs
b. F/W rated, but	e. 201-400 hrs	h. 801-1000 hrs
flew 0 hours	f. 401-600 hrs	i. 1001-1200 hrs
c. 1-100 hrs		j. More than 1200 hrs

4. How many hours did you fly rotary wing aircraft (R/W) (military time only) during the past 12 months?

a. Not R/W rated	d. 101-200 hrs	g. 601-800 hrs
b. R/W rated, but	e. 201-400 hrs	h. 801-1000 hrs
flew 0 hrs	f. 401-600 hrs	i. 1001-1200 hrs
c. 1-100 hrs		j. More than 1200 hrs

5. Under which duty designation did you log the majority of your hours flown in the past 12 months? Select only one.

a. Aircraft commander	d. Copilot	g. I didn't log
b. Pilot	e. Student pilot	time the past
c. Instructor pilot	f. Flight evaluator	year

6. What type of rotary wing instrument flight rating do you hold? Select only one.
- | | |
|-------------|-------------------------------------|
| a. Tactical | d. One of the above but not current |
| b. Standard | e. Not rotary wing instrument rated |
| c. Special | |
7. What type of fixed wing instrument flight certificate do you hold? Select only one.
- | | |
|-------------|-------------------------------------|
| a. Standard | c. One of the above but not current |
| b. Special | d. Not fixed wing instrument rated |
8. Consider the flying requirements of your current assignment. How many hours of instrument flight time, excluding synthetic trainer, do you feel you need annually to be able to safely fly the missions you are assigned?
- | | | |
|-------------------------|-----------|-------------------|
| a. Not instrument rated | d. 15 hrs | g. 30 hrs |
| b. 5 hrs or less | e. 20 hrs | h. 35 hrs |
| c. 10 hrs | f. 25 hrs | i. 40 hrs |
| | | j. 45 hrs or more |
9. It is often said much of flying falls in the "boring holes" category. Of the hours you flew the past 12 months, what percentage would fall in that category?
- | | | |
|-----------|-----------|------------------|
| a. None | d. 21-30% | g. 51-60% |
| b. 1-9% | e. 31-40% | h. 61-70% |
| c. 10-20% | f. 41-50% | i. 71-80% |
| | | j. More than 80% |
10. What is the total number of hours you have logged to date in fixed wing aircraft? (Military time only)
- | | | |
|------------------|------------------|-------------------|
| a. Not F/W rated | d. 801-1200 hrs | g. 2001-2400 hrs |
| b. 1-400 hrs | e. 1201-1600 hrs | h. 2401-2800 hrs |
| c. 401-800 hrs | f. 1601-2000 hrs | i. 2801-3200 hrs |
| | | j. 3201-3600 plus |
11. What is the total number of hours you have logged to date in rotary wing aircraft? (Military time only)
- | | | |
|------------------|------------------|-------------------|
| a. Not R/W rated | d. 801-1200 hrs | g. 2001-2400 hrs |
| b. 1-400 hrs | e. 1201-1600 hrs | h. 2401-2800 hrs |
| c. 401-800 hrs | f. 1601-2000 hrs | i. 2801-3200 hrs |
| | | j. 3201-3600 plus |

12. Regarding proficiency (standardization) check rides that are scheduled periodically by most units, how do you rate your rides of the past 12 months?
- Periodic check rides aren't required
 - Outstanding
 - Not outstanding but satisfactory
 - Marginal could be improved
 - Poor in need of improvement
13. If you were to take a comprehensive closed book examination on the emergency procedures on the aircraft you now fly most often, how many questions could you answer correctly?
- About 10%
 - About 25%
 - About 50%
 - About 70%
 - About 80%
 - About 90% or better
14. On the answer sheet, enter the type, model and series of aircraft you now fly most often, for example, CH-47C.
15. If you were to take a standardization (contact) check ride today in the aircraft you named above, what do you believe your chance of flying an acceptable ride would be?
- About 10%
 - About 25%
 - About 50%
 - About 75%
 - Confident I could fly an acceptable ride
 - Almost certain to get an "unsatisfactory"
16. Reference the above question. What would your chance be if the aircraft used for the check ride were the aircraft you would most likely fly in combat?
- Aircraft is the same as in Question 14
 - About 10%
 - About 25%
 - About 50%
 - About 75%
 - Confident I could fly an acceptable ride
 - Almost certain to get an "unsatisfactory"
 - Civilian - not applicable
17. Consider the aircraft you would probably fly in combat. How much flight time with an IP would you require to be confident of your ability to fly in combat?
- 0
 - 5 hrs
 - 10 hrs
 - 15 hrs
 - 20 hrs
 - 25 hrs
 - 30 hrs
 - 35 hrs
 - 40 hrs or more
 - Civilian - not applicable

18. Consider the aircraft you wrote into Question 14. Do you consider that aircraft: (Select one)
- a. very easy to fly?
 - b. easy to fly?
 - c. moderately difficult to fly?
 - d. very difficult to fly?
19. Consider the same aircraft again. The -10 Operator's Manual: (Select two choices - one from a, b, c and one from d, e, f)
- a. is easy to understand.
 - b. is difficult to understand.
 - c. is nearly impossible to understand.
 - d. covers the operator's needs thoroughly.
 - e. covers the operator's needs adequately.
 - f. covers the operator's needs poorly.
20. How many hours of rotary wing instrument flight time would you need with an instructor in order for you to fly first pilot in instrument meteorological conditions (IMC) safely?
- a. Not R/W instrument rated
 - b. Presently competent to fly as first pilot in IMC safely
 - c. 5 hrs or less
 - d. 10 hrs
 - e. 15 hrs
 - f. 20 hrs
 - g. 25 hrs
 - h. 30 hrs
 - i. 35 hrs
 - j. 40 hrs
21. How many hours of fixed wing instrument flight time would you need with an instructor in order for you to fly as first pilot in IMC safely?
- a. Not F/W instrument rated
 - b. Presently competent to fly as first pilot in IMC safely
 - c. 5 hrs or less
 - d. 10 hrs
 - e. 15 hrs
 - f. 20 hrs
 - g. 25 hrs
 - h. 30 hrs
 - i. 35 hrs
 - j. 40 hrs
22. During the past year, which of the following phase(s) of a flight have you flown as the first pilot under actual IMC? Select only one.
- a. Take-off, approach & enroute
 - b. Approach and enroute
 - c. Take-off and enroute
 - d. Take-off and approach
 - e. Take-off only
 - f. Approach only
 - g. Enroute only
 - h. None

23. In the past year, how much actual weather time have you logged?
- | | | |
|--------------------|--------------|---------------------|
| a. 0 hrs | d. 4-6 hrs | g. 15-20 hrs |
| b. Less than 2 hrs | e. 8-10 hrs | h. 20-25 hrs |
| c. 2-4 hrs | f. 10-15 hrs | i. More than 25 hrs |
24. When you are doing the flying, the possibility of a crash occurring enters your mind:
- | | |
|-----------------|---------------|
| a. Almost never | c. Frequently |
| b. Occasionally | d. Constantly |
25. When someone else is doing the flying, the possibility of a crash occurring enters your mind:
- | | |
|-----------------|---------------|
| a. Almost never | c. Frequently |
| b. Occasionally | d. Constantly |
26. If you were flying as aircraft commander and suddenly lost all engine power, what do you think your overriding concern would be? Select only one.
- Lock shoulder harness, tighten seat belt
 - Emergency communication (May Day)
 - Locate survival gear
 - Initiation of aircraft emergency procedures
 - Look for emergency landing site
 - Probability of crash injuries
 - Probability of fire
27. Improvements in which of the following areas would, in your opinion, contribute most to aircraft accident prevention? Select three.
- Unit flight training
 - Flight school training
 - Aircraft reliability
 - Aircraft mission suitability
 - Combat readiness training program
 - Enforcement of flight regulations
 - School training for maintenance personnel
 - Unit training for maintenance personnel
 - Air traffic control system

28. Of the following people, select three who need most to improve their contribution to aircraft accident prevention:
- | | |
|---|--|
| a. Aircraft mechanics | f. Non-rated commanders |
| b. Flight surgeons | g. Operations officers |
| c. Individual aviators | h. School-trained aviation safety officers |
| d. Aviation unit commanders | i. Maintenance supervisors |
| e. Staff aviation officers in higher headquarters | j. Air traffic controllers |
29. If you decided in your present assignment that you needed some additional instruction with an IP, how difficult would it be to get?
- | | |
|--------------|----------------------|
| a. Very easy | d. Very difficult |
| b. Easy | e. Nearly impossible |
| c. Difficult | |
30. If you indicated difficulty above, what is the difficulty? (May select more than one if appropriate)
- | | |
|-------------------------|--------------------------------|
| a. No difficulty | d. Other duties prevent flying |
| b. Aircraft unavailable | e. Flying hour limitations |
| c. IP unavailable | |
31. If you were to have an accident tomorrow in the aircraft which you indicated in Question 14 and the accident was not your fault, which of the following do you feel would be the most likely cause of the accident? Select only one.
- Materiel malfunction
 - Materiel failure
 - Maintenance error
 - Supervisory error
 - Airfield/heliport facilities
 - Air traffic control error
 - Faulty equipment design
 - Other personnel (crew chief, passenger, ground guide, etc.)
 - Weather conditions
32. Rank the items listed below in the order which you feel each is most likely to perform its intended emergency/protective function reliably. (#1 most likely, etc.)
- | | |
|-------------------------------------|-------------------|
| a. Crash protective helmet | d. Survival radio |
| b. Nomex fire retardant flight suit | e. Pen gun flares |
| c. Body armor | f. Strobe light |
| | g. Nomex gloves |

33. If a crash should occur in the aircraft you indicated in 14, what is the likelihood of your being injured through one of the following? Rank in order of your concern (#1 most concerned, etc.)
- a. Failure of restraint system (lap belt, shoulder harness)
 - b. Failure of seat
 - c. Loose objects becoming missiles
 - d. Crushing in of aircraft structure
 - e. Fire
 - f. Entrapment
 - g. Loss of protective helmet
34. Consider the aviation people with whom you now fly and work. Which of the following would you expect to be the cause or contributing factor of an aircraft accident involving these people? Rank in order of likelihood (#1 most likely, etc.).
- a. Alcohol abuse (including hangover-impaired performance)
 - b. Inadequate training
 - c. Inadequate supervision
 - d. Drug abuse
 - e. Fatigue
 - f. Failure to comply with established directives and procedures
 - g. Inexperience
 - h. Lack of proficiency
 - i. Weather conditions
35. Listed below are some elements of a viable aviation safety program. Rate each element for your organization. Place in the block below the corresponding letter on the answer sheet a number indicating 1=excellent, 2=good, 3=fair, 4=poor.
- a. Command interest
 - b. Safety meeting
 - c. Individual aviator standardization
 - d. Elimination of facility hazards
 - e. Adherence to established directives
 - f. Standardization of operational procedures
 - g. "By the book" maintenance
 - h. Physical & mental fitness for assigned duties

NOTE: Only rotary wing and dual rated aviators answer the remaining questions. Aviators rated only in fixed wing aircraft fold and return your answer sheet to your examiner. You may keep the questionnaire. AR 15-76 authorizes direct communication with USABAAR. If you have any comments or suggestions to make, send them to Chief, Technical Research and Application Department, ATTN: LSS, USABAAR, Fort Rucker, Alabama 36360.

36. How many emergency autorotations have you ever made (including the final pitch application) after losing all engine power?

- | | | |
|------|------|--------------|
| a. 0 | d. 3 | g. 6 |
| b. 1 | e. 4 | h. 7 |
| c. 2 | f. 5 | i. 8 |
| | | j. 9 or more |

37. How many of the above autorotation(s) occurred over terrain which made it impossible to make an emergency landing without causing major damage to the aircraft?

- | | | |
|------|------|--------------|
| a. 0 | d. 3 | g. 6 |
| b. 1 | e. 4 | h. 7 |
| c. 2 | f. 5 | i. 8 |
| | | j. 9 or more |

38. How many emergency autorotations have you made (including the final pitch application) when partial power was available?

- | | | |
|------|------|--------------|
| a. 0 | d. 3 | g. 6 |
| b. 1 | e. 4 | h. 7 |
| c. 2 | f. 5 | i. 8 |
| | | j. 9 or more |

39. How many of these autorotations occurred over terrain which made it impossible to make an emergency landing without causing major damage to the aircraft?

- | | | |
|------|------|--------------|
| a. 0 | d. 3 | g. 6 |
| b. 1 | e. 4 | h. 7 |
| c. 2 | f. 5 | i. 8 |
| | | j. 9 or more |

40. Have you ever had an accident when practicing autorotations? How many?

- | | | |
|------|------|--------------|
| a. 0 | d. 3 | g. 6 |
| b. 1 | e. 4 | h. 7 |
| c. 2 | f. 5 | i. 8 |
| | | j. 9 or more |

41. Imagine you are at the controls of the rotary wing aircraft you now fly most often, cruising (above the terrain) at traffic pattern altitude, visibility is clear, the hour is 1100, the aircraft weight is maximum gross when suddenly all engine power is lost. Straight ahead within reach, however, into a 5 kts wind is an area clear of obstacles. Consider your current level of proficiency. What are your chances of making the landing without damage to the aircraft?
- a. I am not now flying rotary wing aircraft
 - b. About 10%
 - c. About 25%
 - d. About 50%
 - e. About 75%
 - f. I am confident I could
42. Write in the type, model and series aircraft you had in mind when you answered Question 41. If you are not now flying R/W aircraft, write in the one you would fly ordinarily.
43. If you are not now flying rotary wing aircraft, how would you have answered Question 41 at the time you were regularly flying rotary wing aircraft?
- a. About 10%
 - b. About 25%
 - c. About 75%
 - d. I am confident I could have
 - e. I am now flying rotary wing aircraft
44. Imagine again the situation in Question 41, but this time you are a passenger. How many aviators in your unit would you care to have at the controls to make the landing?
- a. About 10%
 - b. About 25%
 - c. About 50%
 - d. About 75%
 - e. Practically everyone

For the following items select only one choice, the choice which best expresses your opinion.

45. Practice autorotations flown to touchdown are unnecessary risk.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree

46. Proficiency in autorotation landings can be accomplished by terminating practice autorotations with a full power recovery at 100 ft. above ground level (AGL).
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
47. The main purpose of flying practice autorotations to touchdown is to give aviators needed confidence.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
48. Practice autorotations flown to touchdown give aviators a false sense of their ability to handle a real emergency.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
49. Practice autorotations flown to touchdown should be included in transition training.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
50. Practice autorotations flown to touchdown should be included in refresher training, e.g., training of aviators coming off ground duty.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
51. Aviators who demonstrate they can make a power recovery practice autorotation (full power restored at 100 ft AGL) are proficient enough to handle an emergency autorotation to prevent major damage to the aircraft.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree

52. Aviators who demonstrate they can make a power recovery practice autorotation (full power restored at 100 ft AGL) are proficient enough to handle an emergency autorotation to allow the crew to walk away.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
53. During proficiency training flights, it should be left to the IP to determine whether his trainee needs to fly one or more autorotations to touchdown.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
54. Whether practice autorotation landings will be flown to touchdown is the prerogative of the commander.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree
55. An aviator knows when he needs to practice autorotation landings to touchdown.
- a. Strongly agree
 - b. Agree
 - c. Undecided
 - d. Disagree
 - e. Strongly disagree

Fold your answer sheet and return it to your examiner. You may keep the questionnaire. AR 15-76 authorizes direct communication with USABAAR. If you have any comments or suggestions to make, send them to Chief, Technical Research and Application Department, ATTN: LSS, USABAAR, Fort Rucker, Alabama 36360.

USABAAR thanks you for your time and cooperation.