PPDR HANDBOOK

Use of Pilot Performance Description Record in Flight Training Quality Control

Human Resources Research Office

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PPDR HANDBOOK

USE OF PILOT PERFORMANCE DESCRIPTION RECORD IN FLIGHT TRAINING QUALITY CONTROL

by

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FOREWORD

The material contained in this Handbook was developed by the Human Resources Research Office as part of a research program, under Work Sub-Unit LIFT II, to develop more objective and reliable measures of helicopter flight performance. The handbook was prepared for use in training helicopter check pilots in using the Pilot Performance Description Record (PPDR), an analytic means of measuring progress in primary helicopter flight training, developed by HumRRO under Work Unit LIFT. Development of the PPDR is described in HumRRO Technical Report 77, *Improving Flight Proficiency Evaluation in Army Pilot Training*, May 1962.

The PPDR method of measuring trainee flight performance and its associated training quality control system were adopted by the U.S. Army Primary Helicopter School, Fort Wolters, Texas. The handbook has since been an integral part of check pilot training. While the handbook is specific to primary helicopter flight training, the general principles and approaches to measurement of complex psychomotor skills embodied in it are equally applicable to other situations.

Work Unit LIFT research was performed at HumRRO Division No. 6 (Aviation), Fort Rucker, Alabama. Dr. George D. Greer, Jr., was Director of Research when LIFT II was initiated; Dr. J. Daniel Lyons and Dr. Wallace W. Prophet held this position during later phases of the work. Dr. Greer was the first Work Unit Leader and was followed by Dr. Carroll M. Colgan.

The initial version of the handbook was prepared in 1959 by Dr. Greer, Mr. Wayne D. Smith, and Capt. Jimmy L. Hatfield. This revised version, based on several years experience in PPDR use, was prepared by Dr. Colgan and Mr. John O. Duffy.

The military and civilian personnel of the U.S. Army Primary Helicopter School cooperated closely with HumRRO Division No. 6 in the development of the PPDR and the associated Quality Control Program. Maj. Edgar N. Anderson (Ret.) of the School staff was particularly helpful in preparing this handbook.

HumRRO research for the Department of the Army is conducted under Contract DA 44-188-ARO-2 and under Army Project 2J024701A712 01, Training, Motivation, Leadership Research.

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I. INTRODUCTION

The purpose of this handbook is to provide a method of describing and evaluating helicopter student pilot performance that is more reliable and yields more complete descriptions of the student's performance than does the traditional system, and to provide a program for instructing appropriate personnel in its use.

The device for measuring student proficiency—the Pilot Performance Description Record (PPDR)—described in this handbook, does not overcome all the difficulties encountered in flight training evaluation. It has, however, when properly utilized, been shown to be capable of effecting a substantial improvement over the traditional method.

Research data clearly show that the traditional methods of evaluating flying proficiency are too general and have resulted in the loss of much descriptive information. This finding has been shown to be generally true of flight proficiency evaluation methods in Air Force, civilian, and Army flight training programs.[1] This is not to say that the Army's program or the other flight training methods have failed to produce satisfactory aviators. However, in the interests of obtaining more effective training per dollar spent, these shortcomings in flying proficiency evaluation deserve attention. Utilization of the evaluation system described herein has proved effective at the U.S. Army Primary Helicopter School (USAPHS), Fort Wolters, Tex., and has provided the basis for a training quality control program at that School.[2] Adoption of this system can be expected to result in more efficient evaluation and also to provide a basis for objective detail about student performance and quality.

[1]This research is summarized in Reference 5.

[2]The views of the USAPHS on the operation and effectiveness of the Quality Control Program are presented in Reference 6, pp. 361-367.

II. THE PILOT PERFORMANCE DESCRIPTION RECORD

PPDR Development and Format

Interest in the development of a new method for evaluating flight proficiency resulted from a survey of the Army's primary helicopter flight training program. In conjunction with the development of this method, a review of the extensive literature reporting previous flight training research was undertaken by the U.S. Army Aviation Human Research Unit at Fort Rucker, Ala.[1] An analysis of grade books and interviews with instructors provided a basis for determining, at a general level, the most frequent errors made by students.[2]

Each flight maneuver was analyzed and then verified in flight to determine its fundamental components. These analyses provided the basis for the development of descriptive and judgmental scales on which each performance component, such as direction, attitude, power, and flight path, could be quickly described by the check pilot. Examples of several scales are presented in Figure 1.

The PPDR does not provide an absolutely complete description of student performance; however, the description that results is probably as complete as can be obtained by a human recorder during a single flight period.

The check ride is separated into the major maneuvers to be tested. Each maneuver is divided into segments that specify the observations to be made as objectively as possible. During a flight check, student performance normally is recorded near the end of each segment, provided that performance is within the limits specified as "proper" on all scales in that segment. Whenever an error exceeding "proper limits" of a scale occurs, the check pilot records it immediately, regardless of how much of the segment is completed. If, later in the segment, the student exceeds his previous error on the same scale, the check pilot makes a second mark farther out on the scale. Scale marking is illustrated in Figure 2. Generally speaking, erratic performance is reflected by multiple marking; for example, if the rate of closure during an approach is uneven, both "Slow" and "Fast" may be marked.

The guiding principle for administering the PPDR is: Obtain a maximum of descriptive and specific judgmental information with a minimum of marking. With instruction and practice, the

[1] See Reference 5.
[2] This preliminary work is reported in Reference 7.

Examples of Flight Component Scales From the Pilot Performance Description Records

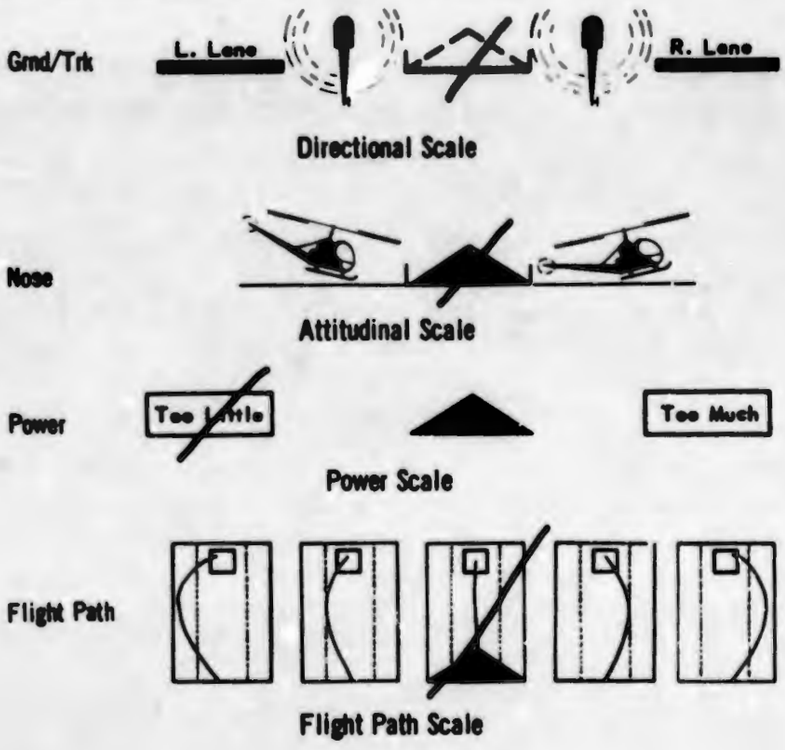

Figure 1

check pilot will learn to record the student's performance accurately and quickly. It has been found that some check pilots almost never make more than one or two marks on a scale; others may make slash markings on the scale six or seven times, reflecting each minor deviation from a previous procedure. After an error has been recorded, any additional error that occurs should be recorded on that scale only if it is (1) in the opposite direction, or (2) larger than the first error. Having the maneuvers described by the various scale markings need not prevent the check pilot from making written comments and, in fact, he is encouraged to do so in the margins of the PPDR.

Multiple Marking on the Performance Scales

Figure 2

III. CHARACTERISTICS OF THE PPDR

There are three general levels of detail represented in the PPDR: (a) individual performance items or scales, (b) flight segments, and (c) maneuvers. Some of the factors involved in each of these levels are discussed below.

A. Individual Performance Items or Scales

The PPDR measuring scales show the detailed and descriptive criteria of student performance which underlie the evaluations made by check pilots under the traditional system. Fifty-eight different types of scales, on which descriptions or judgments can be quickly and accurately recorded, are used in the PPDR.

Types of Scales

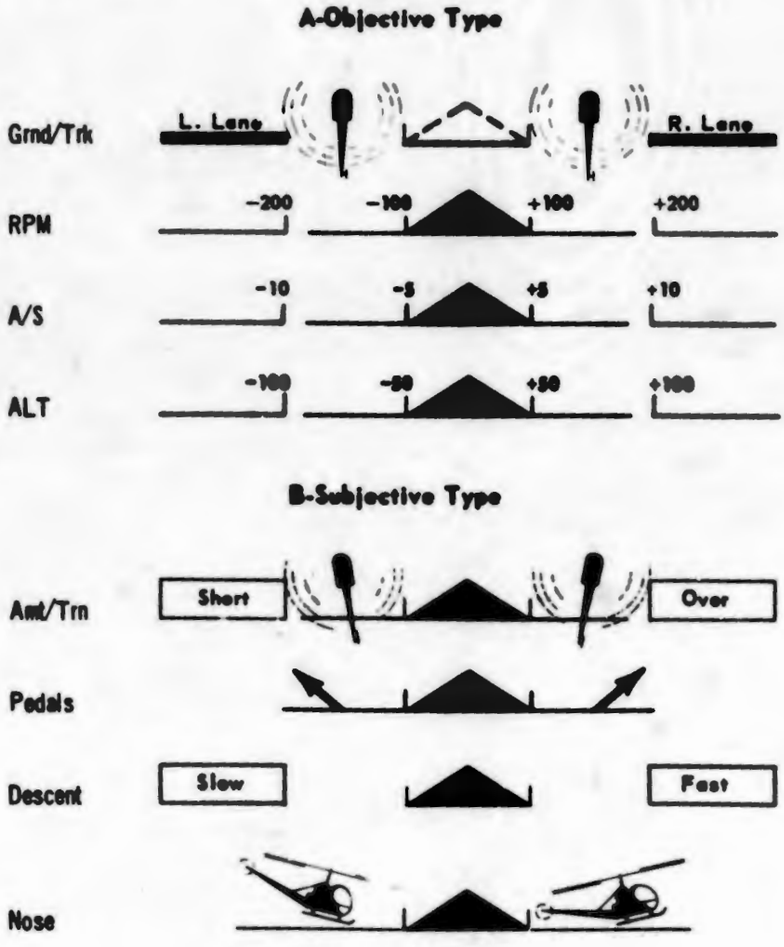

Figure 3

Some of the scales—for example, RPM, Air Speed (A/S), Altitude (ALT), Ground Track (Grnd Trk)—are objective in nature, in that the check pilot records a reading from a gauge or refers to an approach lane or some other clearly specifiable outside referent (see Figure 3-A). However, it is not always possible to find such objective outside referents for certain crucial aspects of student performance. Therefore, some of the scales—for example, Pedals, Nose, Descent, Amount of Turn (Amt/Trn) are subjective (see Figure 3-B).

Although only 18 of the 58 scales listed may be classified as objective or relatively objective, this proportion does not indicate the relative objectivity of the over-all PPDR, since each scale is not used the same number of times in the various maneuver segments. These 18 objective scales in their many repetitions constitute 52% of the Primary and 41% of the Basic PPDR's. Each objective scale is used from 1 to 29 times.

The various scales and their sequence and arrangement on the pages of the PPDR were designed to be as descriptive of a maneuver as possible to facilitate use by the check pilot and analysts.

B. Flight Segments

The subdivision of PPDR flight maneuvers into segments is indicated by single or double solid lines between segments (see Figure 4). The segment breaks serve to remind the observer of the time required for that particular group of scales. More importantly, they make it easier for the observer to focus on a particular group of scales for the specific portion of flight performance being recorded. This reduces the difficulty in determining the flight performance sample to which each scale applies. For example, in the "descent" segment of the Confined Area Operation (see Figure 4, items 21-24), the four scales apply only to the flight performance segment between approach entry and over the barrier, where the flight termination begins. Occasionally a scale refers only to a specific part (beginning or end) of a segment, but these instances will be obvious to the check pilot.

The items in Figure 4 are numbered from the bottom of the page to the top, starting at the lower left-hand corner of the page. This arrangement of items was decided upon during the course of developing the PPDR. It facilitated more accurate in-flight marking by the check pilots.

C. Maneuvers

The flight check is, like most tests, a sampling of behaviors from a much larger universe of behavior situations. The maneuvers included in the PPDR booklet are a function of the particular sample of flight behavior taught in a given stage of training. It is obvious that the evaluation of a given student is related to the extent to which the flight test sample happens to tap skill areas in which he is more or less adept. Therefore, there are several factors about the flight test sample that the PPDR seeks to control, that is, to make as nearly as possible the same for

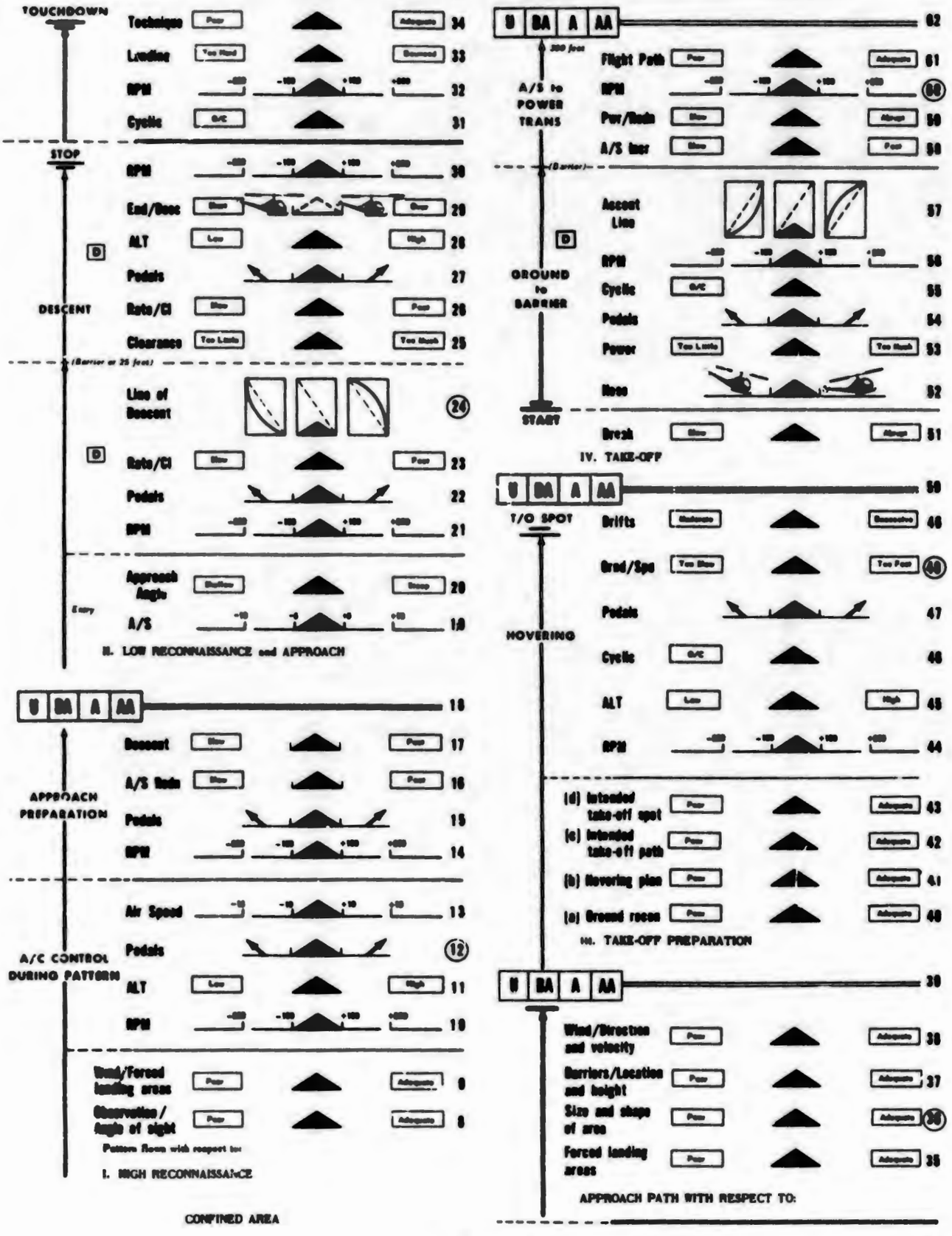
TOUCHDOWN
Technique
Poor
Adequate
34
Landing
Too Hard
Bounced
33
RPM
32
Cyclic
F/C
31
STOP
RPM
30
End/Base
Slow
Fast
29
ALT
Low
High
28
D
Pedals
27
DESCENT
Rate/Cl
Slow
Fast
26
Clearance
Too Little
Too Much
25
(Barrier at 25 feet)
Line of Descent
24
D
Rate/Cl
Slow
Fast
23
Pedals
22
RPM
21
Approach Angle
Shallow
Steep
20
Entry
A/S
19
II. LOW RECONNAISSANCE and APPROACH
U
BA
A
AA
18
Descent
Slow
Fast
17
A/S Rate
Slow
Fast
16
APPROACH PREPARATION
Pedals
15
RPM
14
Air Speed
13
Pedals
12
A/C CONTROL DURING PATTERN
ALT
Low
High
11
RPM
10
Wind/Forced landing areas
Poor
Adequate
9
Observation/ Angle of sight
Poor
Adequate
8
Pattern flown with respect to:
I. HIGH RECONNAISSANCE
CONFINED AREA
U
BA
A
AA
62
200 feet
Flight Path
Poor
Adequate
61
A/S to POWER TRANS
RPM
60
Pwr/Rate
Slow
Abrupt
59
A/S Incr
Slow
Fast
58
(Barrier)
Ascent Line
57
D
RPM
56
GROUND to BARRIER
Cyclic
F/C
55
Pedals
54
Power
Too Little
Too Much
53
Nose
52
START
Break
Slow
Abrupt
51
IV. TAKE-OFF
U
BA
A
AA
50
T/O SPOT
Drifts
Noticeable
Excessive
49
Grnd/Spd
Too Slow
Too Fast
48
Pedals
47
HOVERING
Cyclic
F/C
46
ALT
Low
High
45
RPM
44
(d) Intended take-off spot
Poor
Adequate
43
(c) Intended take-off path
42
(b) Hovering plan
41
(a) Ground recon
40
III. TAKE-OFF PREPARATION
U
BA
A
AA
39
Wind/Direction and velocity
38
Barriers/Location and height
37
Size and shape of area
36
Forced landing areas
35
APPROACH PATH WITH RESPECT TO:

Figure 4

all students. One factor, the specification of performance scales and segments, has already been discussed. The PPDR requires that all students perform the same maneuvers. This insures that the same behaviors are sampled in all students. The maneuvers for which Primary and Basic PPDR's have been developed and tested are listed in Tables 1 and 2.

Table 1

Number of Flight Items by Maneuver: Primary PPDR

Maneuver	Number of Flight Items
1. 90° clearing turn	4
2. Normal takeoff	9
3. Traffic pattern	21
4. Normal approach	15
5. 180° clearing turn	4
6. Maximum performance takeoff	11
7. Traffic pattern	21
8. Steep approach	15
9. Basic autorotation	17
10. 180° autorotation	22
11. 360° clearing turn	4
12. Running takeoff	15
13. Traffic pattern	21
14. Running landing	18
15. Forced landing	23
16. Forced landing from a hover	8
17. Hovering autorotation	8

Table 2

Number of Flight Items by Maneuver: Basic PPDR

Maneuver	Number of Flight Items
1. High reconnaissance (confined area)	10
2. Low reconnaissance and approach (confined area)	20
3. Takeoff preparations	10
4. Takeoff	11
5. High reconnaissance (pinnacle operation)	10
6. Low reconnaissance and approach (pinnacle operation)	20
7. Takeoff preparations	10
8. Takeoff	12
9. High reconnaissance (running landing)	10
10. Approach (running landing)	16
11. Takeoff	16
12. Forced landing	20
13. Power recovery	3
14. Forced landing from a hover	8
15. Slope operation (right skid uphill)	11
16. Slope operation (left skid uphill)	11

Because the sequence in which maneuvers are given in a flight check can affect the results of the flight check, the PPDR standardizes the sequence for all students. Although the use of any particular sequence is not critical to the effectiveness of the PPDR, only one sequence should be used. The sequence settled upon should allow for maximum utilization of available time and resources and the only maneuver to break that sequence should be the forced landings. The sequence of maneuvers suggested (Tables 1 and 2) for the Primary and Basic level check rides was developed to utilize most effectively the stagefield and area layout at the USAPHS. It should be the prerogative of the training supervisor to modify the sequence to suit his training area. Once this has been done, the same sequence should be used by all check pilots under his supervision. Any change in sequence of maneuvers from that presented in this manual must be accompanied by appropriate changes in page and scale numbers of the PPDR booklets.

In any testing situation, test reliability (meaning consistency or repeatability of test result) and test validity (meaning measurement of that which is intended to be measured) are desirable goals.[1] One necessary factor in achieving high levels of test reliability and validity is standardization of the test sample, test conditions, and methods of scoring or evaluating results. The standardization of the flight test sample and the methods for administering and evaluating it are the aims of the PPDR program.

[1]See the discussion of reliability and validity in Section V, p. 18.

IV. GENERAL INSTRUCTIONS FOR USE OF PPDR

PPDR reliability is dependent upon the degree of standardization achieved in administering check rides. Standardization is important in all aspects of the check ride process—the measuring instrument (PPDR), the flight performance sample, and the method and conditions for administering the check ride. Therefore, it is essential that every check pilot thoroughly understand each scale as defined in Appendix A of this report. In addition to learning the scale definitions, check pilots must adhere to the following general instructions in order to standardize administration of the PPDR.

A. Recording

The PPDR serves two general purposes: (1) providing the record or basis on which the check pilot can evaluate the individual student's exhibited flight proficiency, and (2) providing the records for many students which can be combined into a picture of group performance for classes, courses, and other groupings. For this reason it is important that the check pilot clearly understand that he has two roles, recorder and evaluator. His function as recorder is to secure the most accurate and complete picture of student performance as it actually happens. After completion of the check ride, the check pilot in his role of evaluator places the particular performance recorded in the PPDR on the flight proficiency continuum, making allowance for the prevailing conditions and their effect on the student's performance.

In order to achieve this goal of accuracy and completeness of recording, the student's performance should be recorded as soon after it occurs as is practical, with due consideration for safety.

1. Safety Considerations

Normally, the check pilot should record in flight as the student performs, to insure accuracy of the records. However, the recording duties of the check pilot, who also serves as safety pilot, must not be so manifold as to detract from safety considerations.

The check pilot must attend to all the pertinent cues required for accurate observation of the check ride. The only additional task imposed upon him during the check ride is the slash marking of the PPDR booklet. With proper training and practice this marking has been found easy to accomplish, and it does not interfere with the check pilot's function as safety pilot during the check ride.

To insure safe administration of the PPDR, the following restrictions are recommended:

a. Only experienced, highly proficient pilots should administer the PPDR.

b. All in-flight preliminary training of a check pilot in the use of the PPDR should be conducted with experienced pilots simulating student performance. This should continue until the check pilot demonstrates that his scan and recording rate are fast enough to enable him also to serve adequately as a safety pilot.

c. For safety reasons, during autorotations and forced landings, no recording should be made. Records should be filled in immediately after completion of these critical maneuvers.

2. General Marking Instructions

The length of the scale slash marking should be approximately 1/4 in., passing evenly through the scale (see Figure 5).

Marking for Dangerous Performance

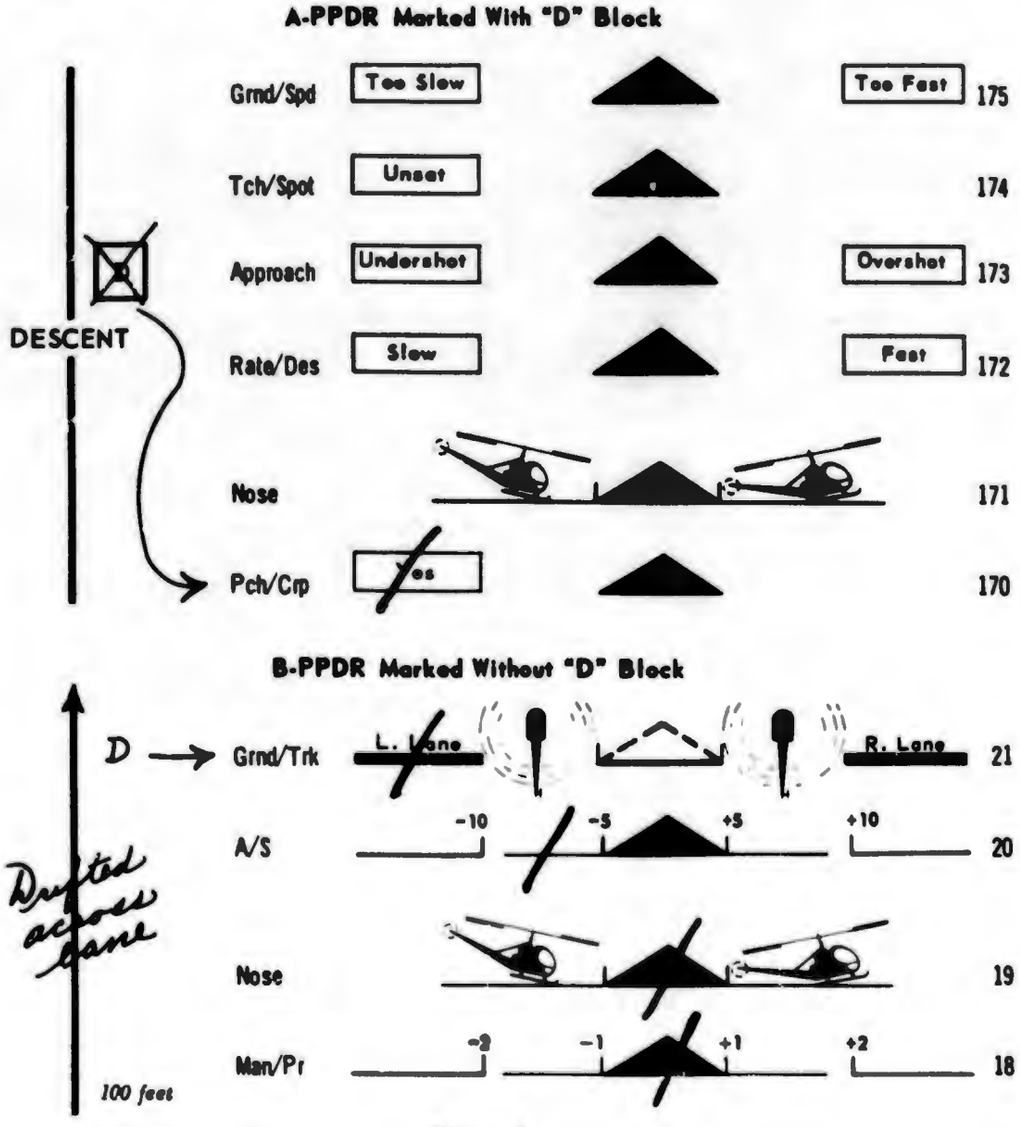

Figure 5

3. Special Recording Problems

a. Dangerous performances. These occur most frequently in autorotation terminations and forced landings. In the appropriate segments of these maneuvers, the PPDR provides "D" blocks which the check pilot must mark when a dangerous performance occurs. When a "D" block is marked, a line should be drawn to the scale(s) to indicate the primary contributor to the dangerous performance (see Figure 5-A). If no scale is appropriate, a description of the performance should be recorded in the margin. Any scales that cannot be completed because of the dangerous performance should be left blank (as in Figure 5-A). If a dangerous performance occurs during the scoring of a segment without a "D" block, the check pilot should write the letter "D" in the left margin, and draw a line to the applicable scale(s) reflecting the dangerous performance or write an appropriate description in the margin (see Figure 5-B).

In the interest of flight safety the check pilot may have to abort a maneuver when student performance becomes dangerous. If this occurs, the check pilot will probably complete the maneuver; then he will complete his records, marking "N/A" for performance scales not used. If student performance becomes dangerous, but not dangerous enough to require taking over the controls, the check pilot permits the student to complete the maneuver in the normal sequence and records the extremely deviant performance on the PPDR scales. If additional comments are necessary, they are noted in the margin after the helicopter is again in safe flight.

b. Check-pilot assistance. The check pilot should always note in the margin whenever he assists the student with a maneuver. The check pilot must determine whether the student's performance in such instances warrants a "D" mark. If the check pilot takes over full control of the helicopter, he should mark in the margin "CP assist" and omit marking the scales through the remainder of the maneuver.

c. Go-around. This may be necessary while flying the traffic pattern due either to student error or to some circumstance beyond student control. When a go-around is initiated, the check pilot should note this fact in the left margin. If the student was not at fault, the check pilot should allow him to re-fly the traffic pattern and repeat the aborted approach, completing the PPDR recording from the point at which the approach was interrupted. If the go-around was necessary because of poor student performance, a notation to that effect should be made in the margin. Any items not completed at the time the go-around was initiated should be left blank.

d. Difficult segments. Segments differ greatly in the number of check pilot observations required and in the time available for recording. The check pilot must be well practiced in the difficult segments where many observations are made at short intervals; otherwise, some scales will not be completed and PPDR reliability will be impaired. There are four flight

segments that cause the most severe recording difficulties in the Primary PPDR:

(1) Base turn and base leg: Here the student is turning and descending at the same time. If the downwind leg is too close to the field, or if there is a crosswind so that the helicopter is actually flying downwind on the base leg, the segment will be very short, leaving little time for observing and recording.

(2) and (3) Final turn and final approach: These two segments, following immediately the difficult base turn and base leg segment, may also be very short because of winds or because the base leg is too close to the field. The critical nature of the final leg in determining the adequacy of the approach makes it very important that final leg performance be described accurately. Practice will reduce the recording difficulties encountered when these segments are exceptionally short.

(4) Maximum performance takeoffs: Low density altitude, high winds, or a powerful aircraft may result in a very brief time between ground-break and an altitude of 300 ft. in maximum performance takeoffs. Again, the check pilot will have little time to observe and record accurately, and by the time the helicopter reaches 300 ft., the pilot must be "caught up."

e. Omitted scales. If the check pilot gets behind in recording, he may find it necessary to omit some scales in order to catch up. When scales have been omitted, he should give the reason in the left margin. He should never go back and attempt to fill in omitted scales.

Forced landings will usually result in the greatest number of omitted scales. The forced landing on the Primary check ride will normally be given in the traffic pattern. If a student is given a forced landing that should be terminated with a touchdown, but performs or plans so poorly that the forced landing cannot be completed, the termination scales must be omitted. The check pilot must indicate the cause, either by a line to the appropriate scale or by a written comment. When practical, the maneuver interrupted by the forced landing should be completed and recorded after accomplishment of the forced landing.

4. Title Page

Space for recording student identification data and weather information is provided on the title page, which is the same for both the Primary and the Basic PPDR's, with one exception: The title page of the Primary PPDR includes one additional item, a space for recording wind direction with relation to the takeoff and approach lane (see Figures 6 and 7). All other information is recorded in the same manner on each PPDR. The required information covers:

a. Student information: Student's last name and initials, rank, class, and flight.

Page One of the Primary PPDR

H-23 PRIMARY

PILOT PERFORMANCE DESCRIPTION RECORDS

STUDENT'S NAME		RANK		CLASS AND FLIGHT
CHECK PILOT		MISSION - - - - - - - - - - - - - FLYING TIME		AIRCRAFT (TYPE AND MODEL)
DATE	INSTRUCTOR		INSTRUCTOR EVAL.	CHECK GRADE

Weather at Stage Field

At beginning of check flight:

WIND: ☐ Headwind ☐ Slight Crosswind ☐ Direct Crosswind

Velocity: _____ under 10 Kn _____ 10-20 Kn _____ over 20 Kn

TURBULENCE: ☐ Calm ☐ Moderate ☐ Rough

At end of flight:

WIND: ☐ Headwind ☐ Slight Crosswind ☐ Direct Crosswind

Velocity: _____ under 10 Kn _____ 10-20 Kn _____ over 20 Kn

TURBULENCE: ☐ Calm ☐ Moderate ☐ Rough

TENSION

1 ☐ No apparent tension 2 ☐ Moderately tense, but not handicapped by it 3 ☐ Very tense, interfered with performance

MANEUVERS (General evaluation)

	1	2	3	4	5	6
U / BA / A / AA						
	PLANNING	JUDGMENT	COORDINATION	ACCURACY AND TECHNIQUE	DIVISION OF ATTENTION	ALERTNESS

7 COCKPIT PROCEDURE [Poor] △ [Good]

Comments and Notes:

Specific Comments

Figure 6

Page One of the Basic PPDR

H-23 BASIC

PILOT PERFORMANCE DESCRIPTION RECORDS

STUDENT'S NAME		RANK		CLASS AND FLIGHT
CHECK PILOT		MISSION - - - - - - - - - - - - - - FLYING TIME		AIRCRAFT (TYPE AND MODEL)
DATE	INSTRUCTOR		INSTRUCTOR EVAL.	CHECK GRADE

Weather at Ships Field:

At beginning of check flight:

WIND: Velocity: _____ under 10 Kn _____ 10-20 Kn _____ over 20 Kn

TURBULENCE: ☐ Calm ☐ Moderate ☐ Rough

At end of flight:

WIND: Velocity: _____ under 10 Kn _____ 10-20 Kn _____ over 20 Kn

TURBULENCE: ☐ Calm ☐ Moderate ☐ Rough

TENSION

1 ☐ No apparent tension 2 ☐ Moderately tense, but not handicapped by it 3 ☐ Very tense, interfered with performance

MANEUVERS (General evaluation)

	1	2	3	4	5	6
	PLANNING	JUDGMENT	COORDINATION	ACCURACY AND TECHNIQUE	DIVISION OF ATTENTION	ALERTNESS
U						
BA						
A						
AA						

7 COCKPIT PROCEDURE Major Errors ▲ Minor Errors

Comments and Notes:

Specific Comments

Figure 7

b. Check ride information: Check pilot's last name and initials, the check ride flying time (after the ride is completed), the aircraft type, and the date of the ride.

c. Instructor information: Space is provided for recording the name of the student's instructor and the instructor's evaluation of the student. It should be noted that this information is not filled in by the check pilot. It is filled in by the quality control clerk only after the check ride has been completed and the check pilot has assigned his check ride grade. This procedure is followed to avoid possible biasing of the check pilot's evaluation of the student.

d. Final grade: After the ride is completed and the errors are reviewed, a grade is entered.

e. Weather: One section applies to weather at the beginning of the check ride, the other to weather at the end of the ride.

f. Tension: After completion of the check ride the check pilot records the general degree of tension exhibited by the student during the ride.

g. Maneuvers (general evaluation): In this section the check pilot records his evaluation of the student's over-all performance with respect to the factors of planning, judgment, coordination, accuracy and technique, division of attention, and alertness. These evaluations are made utilizing a subjective scale based on the student's level of experience, with AA (above average), A (average), BA (below average), and U (unsatisfactory). These over-all evaluations will be reflected in the performance recorded in the PPDR.

h. Procedures: A mark is made through the "Major Errors" block when Standing Operating Procedures (SOPs) were violated or dangerous acts were observed in the performance of cockpit and shutdown procedures. The "Minor Errors" block will be marked for performances that were not dangerous or contrary to SOPs, but in which procedures performed were not in perfect sequence. If no errors were made, the "P" block (Proper) is marked. The nature of the procedural errors should be noted in the "Comments and Notes" section.

i. Specific comments: The check pilot can utilize this section for any specific notations or comments he wishes to make.

B. General Evaluation and Scoring

Upon completion of the ride, the check pilot should use the general evaluation section as a guide to give the student an over-all picture of his progress with respect to planning and judgment. This action appears on the title page of the PPDR and should be filled out as soon after completing the ride as is possible.

The check pilot should debrief the student, using the PPDR flight record as a guide. This procedure is of such great importance to the student that every effort should be made to provide a complete recapitulation of the check ride performance. The PPDR description provides an excellent basis for this.

After debriefing the student, the check pilot assigns an overall summary grade or score for the check ride. The most reliable method of assigning this score is for the check pilot to carefully review the PPDR record and then assign the rating or grade. Any grade falling below 70 is unsatisfactory, grades between 70 and 79 are below average but passing, between 80 and 89 are average, and between 90 and 100 are above average. Details of the procedure followed in standardizing this process and effecting scale anchoring are contained in Section V. This summary grade serves only to provide an approximation of proficiency for the student and as a means of ranking students by flying accomplishment.

C. Check Ride Conditions

1. Primary PPDR

The student should fly the helicopter at all times except when crossing the stagefield (from the autorotation lane to the running takeoff lane). After the last basic no-flare autorotation, and before the first running takeoff, the check pilot should take the controls and hover the aircraft across the stagefield to the running takeoff position. Also, upon completion of the 180° autorotation, the check pilot should fly the helicopter to the parking area. Adherence to this procedure will standardize the number and duration of student breaks and the relative period within the check ride where breaks occur.

All check rides should start at the stagefield where the check will be administered. If the helicopter must be flown from the main heliport to the stagefield, the student executes the cockpit procedure and run-up of the aircraft, and takes off and flies the aircraft to the stagefield where a practice approach is permitted, after which the check ride begins. This procedure insures a warm-up period for the student. The cockpit and run-up procedures are recorded before reaching the stagefield.

The entire check ride should be given without interruption and with no change in helicopters. If a ride is delayed or interrupted, it should be postponed unless enough time remains to complete the entire ride. A different helicopter must not be substituted once the check ride has begun. If a different helicopter must be flown, the entire check ride must be repeated.

All maneuvers should be presented in the established sequence with the exception of forced landings. Forced landings may be given at any time during the check ride; this variation is necessary to prevent the student from learning where or when to anticipate the forced landing.

The PPDR is an evaluation of the student's flight performance proficiency, not a test of memory. Before each trip around the pattern, the check pilot should tell the student the kind of takeoff and approach he is required to make. The student should be familiar with the content and sequence of maneuvers, but should not hesitate to ask questions when in doubt.

2. Basic PPDR

As distinct from the Primary PPDR, which is based on a standardized ride, the Basic PPDR must, of necessity, use a less standardized flight performance sample. However, insofar as possible, the various components of the Basic ride should be administered in the same order for all check rides. Exceptions are forced landings, slope landings, and hovering forced landings. To save time, if a confined area is suitable for the performance of slope operations and for hovering forced landings, the check pilot may administer these maneuvers in that area, breaking the sequence.

As in the Primary PPDR, the student is graded on cockpit and warm-up procedures, and is allowed to take off and fly the helicopter to the Basic maneuver area. On arrival, the check pilot points out the confined area, road, or pinnacle that the student is to use.

Standardization of the Basic PPDR scales is difficult because complex judgments are required on the part of the check pilot. During check pilot training, considerable emphasis must be placed on check pilot agreement as to what constitutes best, adequate, or poor performance. If at all possible, a special set of equally difficult confined areas, roads, and pinnacles should be reserved for the check rides. Otherwise, some instructors might teach the proper solutions to students prior to their check flights.

D. Recommended Check Pilot - Student Relationship

A conflict of personalities between check pilot and student invariably exerts an undesirable influence on student performance and on the evaluation by the check pilot. Every effort should be made to keep the relationship impersonal and matter-of-fact. However, the check pilot's manner should not be so severe as to seem hostile or unfriendly.

In the evaluator's initial contact with the student, he should limit conversation to explaining check ride conditions and requirements. The student should be thoroughly briefed as to what he can expect throughout the check ride. In the aircraft, conversation not essential to conducting the check ride is to be avoided. The student pilot must not, under any circumstances, be given flight instruction relative to his errors during the check ride. Only during the debriefing period will errors be pointed out or other comments be made regarding the student's performance.

V. CHECK-PILOT TRAINING PROGRAM

A. Introduction

1. Goals

The three principal goals of the PPDR check-pilot training program are: (a) to gain maximum uniformity of standards in observing, recording, and evaluating student performance; (b) to develop proficiency in the use of the Primary and Basic PPDR's so that when the check pilot begins testing students he will not fall behind in observing and recording the information; and (c) to provide the check pilot with the skills and habits necessary to administer the PPDR safely.

2. Problems and Administrative Considerations

It has been demonstrated that nonuniformity of standards among check pilots is seriously detrimental to the reliability of both the traditional and PPDR flight performance evaluation systems.[1,2,3] Without uniformity in standards, no check system will be sufficiently reliable to serve the standardization supervisor, instructors, students, or check pilots adequately.

In the past, uniformity of standards has been difficult to attain among check-pilot personnel, primarily because there was little opportunity for a direct comparison between different pilots' standards. Generally, when two pilots had evaluated the same student at different times, disagreements between them as to the student's capability could be attributed to many different factors, for example, variations in weather, aircraft, and requirements placed on the student. However, research strongly indicates that differences in check-pilot standards constitute a more important source of unreliability in flight evaluation than any other single factor.[4]

In the check-pilot training program, considerable time and effort are required from both the student check pilots and the instructor. This expenditure is well justified because the training program provides detailed direct comparisons of the scoring and grading standards of the student check pilots. The comparison is based on ratings by different student check pilots of the same descriptions of student flight performance, that is, the same completed PPDR's. This use of descriptions, rather

[1]Reference 1, pp. 83-109.
[2]See Reference 4.
[3]See Reference 5.
[4]See Reference 5.

than actual student flight, imposes some limitations on identifying differences in standards. However, evaluation of this program has demonstrated that it will, in fact, reduce the differences in check-pilot standards. Such a reduction is fundamental to the reliability of a check system administered by different check pilots.[1]

Approximately 16 hrs. of scoring practice are required of the student check pilots before the Project Officer and his clerical assistants can make a relatively simple analysis of the results. It is urged that the scoring and analysis procedures outlined in this check-pilot training program be applied precisely as directed. The effects will be reflected in more reliable applications of the PPDR, or, for that matter, any flight evaluation system.

In this training program the requirement for establishing a single set of standards is fundamental to the achievement of increased uniformity in flight performance evaluation. A method for establishing a single set of standards is presented in Section B below.

3. Reference Material

This handbook, which specifies the details of application of the PPDR system—administration, scoring, and analysis of PPDR data—is the primary reference to be used. Supplemental information is contained in Technical Report 77 which also provides the rationale of the background research.[2] A related consulting report presents data on the use of the PPDR in the quality control system at the USAPHS.[3] This handbook and both of the reports cited above should be studied carefully by the check-pilot training program director and all student check pilots.[4]

B. Establishment of Scoring Standards for Recommended Program

A single set of scoring standards, against which all individual check pilots can be compared, or toward which each individual check pilot can work, should be established in advance of the training program.

The same set of standard evaluations must be applied consistently to all check pilots. The standards applied as part of the first check-pilot training program should be established with care, and new standards should be developed periodically, especially when significant changes in the school program are to be made.

The scoring standards are based on 10 Primary and 10 Basic PPDR's.[5] These standard booklets represent the range of student performance, from above average to unsatisfactory. The booklets

[1] See Reference 5.
[2] See Reference 5.
[3] See Reference 3.
[4] Copies of these supplemental documents can be obtained from the Chief, U.S. Army Aviation Human Research Unit, Ft. Rucker, Ala.
[5] Copies of standard scoring booklets can be obtained on request from the Commandant, U.S. Army Primary Helicopter School, Ft. Wolters, Tex.

are graded to represent steps in expected student performance which have been found to be identifiable by suitably trained check pilots and which are intended to serve as the anchoring points for check-pilot evaluation of performance. The proficiency level into which each of the 10 standard PPDR's falls is determined by experienced training supervisors, check pilots, and flight instructors. These individuals function in the capacity of a standardization board, whose duty it is to establish criteria for good as well as poor performance.

The standard PPDR is scored by dividing each maneuver into small segments of performance. The reason for subdividing the maneuvers into relatively small segments is to prevent overburdening the evaluator by too numerous or too complex performance samples. A maneuver segment containing 8 or 10 flight items is a manageable-sized flight segment, whereas a whole maneuver containing 30 or more flight items may represent too large a performance sample to evaluate as a whole. Ratings are then assigned to the errors on a defined scale. The scale used for this purpose is as follows:

D	U	BA	A	AA
0	1,2	3,4,5	6,7,8	9,10

Where:

D refers to dangerous
U " " unsatisfactory
BA " " below average
A " " average
AA " " above average

This system requires that each expert evaluator apply his judgment to each segment of recorded performance, take into consideration all the indicated errors, and assign a rating in accordance with the above scale. In the left margin of the PPDR are continuing arrows paralleling students' records of performance (see Figure 4). The evaluator is required to assign one numerical rating to each segment of performance (i.e., from one arrowhead to the next). Each segment should be scored as an entity, disregarding all other performances that have been recorded outside that segment. These segment ratings are then used to arrive at an over-all grade for the entire maneuver. In most cases it will be found that student performance is relatively consistent; that is to say, a student may be expected to produce segment ratings such as 6, 7, and 8, which would place him in the "A" category, or 5, 4, and 3, which would be in the "BA" category for most of the segments of the check ride that he flies. However, occasionally it will happen that a considerable inconsistency arises. For example, two segments of a maneuver might receive ratings of 9 and 10 and the third segment receive a rating of 2. When this happens, the job of assigning the over-all maneuver grade becomes a complex matter and involves the careful evaluation and integration of the particular flight items that have resulted in the inconsistent ratings. In such instances the check pilot will have to appraise the relative importance of the various maneuver segments to the over-all maneuver performance. This appraisal will frequently involve differential weightings of segments in terms of their importance.

The same process should be applied to a second completed set of 10 Primary and 10 Basic PPDR's for use in the final phase of the check-pilot selection program. A total of approximately 16 hrs. of scoring will be required from each of these experts.

This method has the advantage of incorporating the views of a large number of the most experienced personnel. It has the disadvantage of requiring considerable time from persons already committed to their own jobs. However, the standards thus obtained should be worthy of application over a long period of time.

C. Recommended Program of Instruction

As a result of the several years' experience in training check pilots at the USAPHS in the use of the PPDR, the following Program of Instruction is recommended. This program is based on the cumulative experience and suggestions of the Aviation Unit and USAPHS personnel associated with PPDR training. It is necessary, of course, that the person(s) responsible for administering PPDR training to the new check pilot be thoroughly experienced with the PPDR and the training program. The student check pilot should note that the program demands that he take an active part in discussion of the PPDR and his experiences with it if standardization is to be achieved. The Program of Instruction is divided into eight general phases, summarized in Table 3.

Table 3

Outline of Recommended Program of Instruction for Student Check Pilots

Phase of Training	Item	Classroom Hours	Flight Time (per student check pilot)
1	Introductory lecture and discussion	5	
2	Preliminary flight familiarization		3.5
3	Scale definitions[a]: administrative considerations	3	
4	Identification of check-pilot standards (comparison with a single accepted set of standards; familiarization with scoring process)	12	
5	In-flight buddy-ride practice	3	6[b]
6	Check-pilot standardization rides		3
7	Practice with actual students	3	9
8	Final selection of PPDR check pilots	8	
	Total	34	21.5

[a]See Appendix A for scale definitions.

[b]This is buddy-riding and the total flying time amounts to 12 flight hrs. per student, during 6 of which the student check pilot acts in the capacity of a student performing a check ride and during the other 6 hrs. acts in the capacity of a check pilot administering the check ride.

Following are the eight phases of training outlined under each of these headings: (a) Purpose, (b) Time required, (c) Materials required, (d) Content, and (e) Scheduling.

1. Introductory lecture and discussion

a. Purpose: To introduce the student check pilot to the PPDR and its general rationale.

b. Time required: 5 hrs.; approximately 2 hrs. of lecture and 3 hrs. of discussion.

c. Materials required:

This PPDR Handbook

Greer, George D., Jr.; Smith, Wayne D.; and Hatfield, Jimmy L., Improving Flight Proficiency Evaluation in Army Pilot Training, Technical Report 77, Human Resources Research Office, Alexandria, Va., May 1962

Duffy, John O., and Colgan, Carroll M., A System of Flight Training Quality Control and Its Application to Helicopter Training, LIFT IV Consulting Report, Human Resources Research Office, Alexandria, Va.

Specimen copies of Primary and Basic PPDR's

d. Content: The general material to be emphasized concerns the requirements for a good flight proficiency evaluation system and their importance to the PPDR. Specific points to be emphasized include:

(1) Objectivity of judgment cannot be completely attained because of the nature of flying. However, specific referents are available that allow for considerable objectivity. Judgments can be objective for those aspects of flight performance that can be described in a clear, unequivocal manner (e.g., RPM 100 low or A/S 10 knots high). Precise recording of student performance results in less confusion about what the student actually did. This, in turn, enables more objective evaluation of student proficiency and provides a basis for identification of the student's specific strengths and weaknesses. The more accurate, precise, and detailed the recording of flight performance, the more objective is the evaluation of student proficiency.

(2) Reliability refers to the consistency with which a check pilot will award the same evaluation and grade for the same flight performance. For example, if two check pilots observed and evaluated the same performance by a student, their PPDR recordings should be identical and they should both evaluate and grade the student in the same way. The extent to which this objective is achieved may be regarded as the extent to which check-pilot standardization is achieved and check-pilot observation and evaluation is reliable. It must be understood that the aim of the evaluation system is for all of the check pilots to apply standards consistent, not only with themselves, but with all other members of the check section.

(3) Validity refers to the accuracy with which student check ride performance and the evaluation thereof reflect real flight proficiency. When the student's check ride performance is influenced by such factors as unusual weather, aircraft difficulties, unusual traffic conditions, sampling or sequence of

maneuvers, or any other factors that interfere with his performance of maneuvers on the check ride, the validity of the check ride is reduced. Also, when the evaluation of the student's check ride is influenced by personality conflicts with check pilots, halo effects (described below), or any other factors that cause check pilots to evaluate students on a basis other than their actual flight performance in the aircraft, the validity of the check ride is reduced. The PPDR-based flight proficiency evaluation system is intended to measure the extent to which objectives of the training program are being realized. Any extraneous influences that interfere with the carrying out of this aim reduce the validity of the system.

(4) Halo effect may be described as influences which are not directly pertinent to, but which affect the judgment or perception of the check pilot in his observation and evaluation of student performance. Halo effect is related in some ways to suggestibility and detracts from the accuracy and fairness of the flight evaluation. Sources of halo effect in the check ride situation are:

(a) Personality and appearance of the student may affect the check pilot's judgment of performance.

(b) Knowledge of student's prior performance may result in unconscious bias on the part of the check pilot and influence his judgment of subsequent performance.

(c) Performance during the early part of the check ride may unduly influence the check pilot's judgment of the student's performance during the latter part of the check ride.

(5) Structuring flight proficiency evaluations—

(a) Variation in flight performance sample. Under the traditional subjective flight check system, the student flight performance sampled on a check ride was determined to a large extent by the check pilot. Each check pilot had a "favorite" set of maneuvers; he was further influenced by such factors as weather conditions, availability of a particular stagefield, and shortage of time. Also, there was variation in the opportunity given students to repeat poorly performed maneuvers. In effect, different students were given different tests, because the test situation was not uniform. To have reliable evaluation, the sample of performance must be uniform: "Every student must be faced with the same set of requirements, under the same conditions."[1] The PPDR is a means of standardizing the test requirements and conditions.

(b) Selective observation and perception. At any one time there are many aspects of flight performance the check pilot may observe, such as attitude, altitude, directional control, and power control. The check pilot can observe only one or two of these aspects at a time. He must also choose what specific referents he will observe, such as the instrument panel or points of reference outside the cockpit. The fact that the check

[1]See Reference 5.

pilot must choose what he observes may result in unreliable observations.[1] The use of the PPDR is a means of achieving standardization in what is observed. It does not rule out the observation of other factors, but it does insure the observation of a standard set of referents.

(c) Selective recall. A check pilot must observe many details during a 1 1/2 hr. check ride. The check pilot's memory becomes a source of potential error if he does not record descriptions and evaluations during or shortly after the performance. The check pilot may recall what was most dramatic or most important from his point of view, but another check pilot may differ with him. The PPDR provides a means for greatly reducing the effects of selective recall.

(6) Effects of differences in standards—

(a) Traditional systems. In the past many of the Army's check pilots varied widely in the standards they applied in check rides. Their personal biases sometimes influenced the check grades they gave, quite independently of the student's actual performance. In an analysis of check-pilot data from rides in rotary wing training during 1956 and 1957, substantial differences were revealed in the range of scores used by various check pilots.[2] Pilots who gave higher grades consistently scored students within a smaller segment of the possible range than did pilots giving lower grades. In another analysis, using fixed wing primary training grades given in 1956 and 1957, there were sizable differences among check pilots in grades given for particular types of check rides. Check pilots who graded strictly or leniently tended to do so for all types of check rides. A more recent analysis (1963) of rotary wing grading practices at the U.S. Army Aviation School, Fort Rucker, Ala., shows that these general findings still hold for traditional subjective grades.[3]

It cannot be assumed, therefore, that using highly experienced, expert flight instructors to make the evaluations will be enough to overcome the potential measurement deficiencies in the system. The check pilot's evaluation techniques must be structured and standardized. Furthermore, check-pilot selection and training must be carefully and thoroughly conducted if the flight check system is to possess validity and reliability.

(b) PPDR system. In the 1958 study, 12 check pilots were trained in the PPDR system. Six were civilian flight commanders or section chiefs and six were military check pilots from the Military Flight Evaluation Division (sometimes referred to as the Military Check Section) at Fort Wolters. Following a training program for the check pilots, 50 Primary and 50 Basic students were administered two successive rides, to obtain an estimate of agreement in the check system. The first ride was administered by a civilian pilot, the second by a

[1]See Reference 5.
[2]See Reference 5.
[3]See Reference 2.

military pilot. As a result of the training in the use of the PPDR, variations among individual check pilots were substantially reduced. The PPDR system proved more analytic and more reliable than the traditional system.

(7) Methods for identifying and modifying standards—Standards are established when agreement is reached among various members of the check section on the interpretation and evaluation of the various maneuvers presented in the completed PPDR. Standards may be modified by altering the agreement on how to evaluate maneuvers or maneuver segments in the standard booklets.

e. Scheduling: There are no particular scheduling requirements involved. The lecture and discussion can be freely intermingled at the instructor's discretion.

2. Preliminary flight familiarization

a. Purpose: To introduce the student check pilot to some of the necessary procedures for in-flight administration of the PPDR and some of the problems attendant thereto. Emphasis will be on safety and the development of a rapid rate of scan.

b. Time: Approximately 3 1/2 hrs. flight time per student check pilot.

c. Materials required: Primary and Basic PPDR's.

d. Content: Practice in division of attention.

e. Scheduling: As required.

3. Scale definitions: administrative considerations

a. Purpose:

(1) To instruct each student check pilot in the definition of each scale and its application in the Primary and/or Basic PPDR (see Appendix A).

(2) To identify the PPDR flight segments that are most difficult to administer and the safety implications thereof (see p. 9 of this report).

(3) To develop a sufficiently rapid rate of scan so that check pilots will be able to observe and mark all of the scales in the PPDR during an actual check ride. The check pilot must function as safety pilot as well as record the check ride.

(4) To define when, how, and where to mark the PPDR (see p. 10).

(5) To answer questions which have arisen as a result of the preliminary flight familiarization.

b. Time: 3 hrs.

c. Materials required: Copies of Primary and Basic PPDR's and copies of PPDR Handbook.

d. Content: Various scales contained in Primary and Basic PPDR's.

e. Scheduling: Scheduled to provide unbroken block of time.

4. Identification of check-pilot standards

One of the important features in the training of student check pilots is the practical demonstration of the fact that the application of different standards to the grading of check rides actually does result in different evaluations. This is done by using the sets of standard PPDR booklets prepared by the student check pilots. These booklets may be compared with each other to illustrate how differences in scoring ranges among evaluators affect the various elements of the check ride and the effect that this may have on the student's ranking.

a. Purpose:

(1) To demonstrate differences in the standards of student check pilots on the basis of their scoring of identical descriptions of student flight performance.

(2) To compare the student check pilot evaluations with the evaluation standards.

(3) To familiarize all student check pilots with a standard scoring procedure.

b. Time:

(1) Approximately 8 hrs. scoring time from each student check pilot.

(2) Approximately 4 hrs. of score compilation and computation (carried out by instructional or clerical staff).

(3) Approximately 4 hrs. of discussion in an attempt to modify differences in check-pilot standards.

c. Materials required:

(1) A single set of scoring standards against which all individual check-pilot standards can be compared, or toward which each individual check pilot can work. Establishment of this set of standards was described on p. 19.

(2) Copies of the 10 Primary and 10 Basic PPDR's used as the basis for the scoring standards.

d. Content: Instructions for implementing standard booklets into a training program to achieve standardization:

(1) Following the PPDR error-pattern scoring directions presented on p. 20, each student check pilot should assign segment scores to each of the 10 Primary and 10 Basic completed PPDR's. This scoring will require approximately 8 hrs. Every effort must be made to ensure that each student check pilot scores all the PPDR's completely independently of the scores given by the other check pilots.

(2) When all ratings have been made by the student check pilots, the scoring analysis is carried out by the instructional staff. To speed the process, a clerk should be available to perform the additions and computations for each booklet. The procedures following the actual ratings are strictly mechanical. The steps are: The ratings assigned by the student check pilot are entered on the proper form, a sample of which is shown in Figure 8. When all of the segment ratings have been entered, they are summed for the entire booklet, and the sum is divided by the number of segments in the booklet. This computation

Standard Booklet Maneuver Segment Ratings by Check Pilot

Standard Booklet No. 1

	Check Pilot Code No.										Empirical Standard Score
	1	2	3	4	5						
First Normal Takeoff Through Normal Approach											
T/O											7
X/Wind, Dn/Wind Turns											9
Dn/Wind											10
Base and Final Turns											6
Final											8
Approach to 50 ft.											5
50 ft. to Hover											4
Second Normal Takeoff Through Normal Approach											
T/O											8
X/Wind, Dn/Wind Turns											9
Dn/Wind											10
Base and Final Turns											6
Final											6
Approach to 50 ft.											4
50 ft. to Ground											4
First Max. Takeoff Through Steep Approach											
T/O											8
X/Wind, Dn/Wind Turns											8
Dn/Wind											10
Base and Final Turns											6
Final											6
Approach to 50 ft.											5
50 ft. to Hover											6

Note: Development of empirical standard scores is described on p. 20.

Figure 8

yields the average segment rating for each booklet. The resulting number is then multiplied by 10 to avoid the use of small fractions, and rounded to the nearest whole digit. The average segment rating for each student check pilot is then entered on the form shown in Figure 9. This form allows comparison of the student's average booklet ratings with the standard booklet average ratings as assigned by the experienced members of the check section. If a student check-pilot average rating deviates from the standard rating by more than three points in either direction, the student check pilot should receive further instruction in assigning segment ratings.[1] Reference should be made to the form shown in Figure 8 showing the individual segment ratings to discover what specific entries resulted in the

[1]The choice of ±3 points as the cut-off score was reached after gaining considerable experience in the standardization of check pilots.

Form for Comparison of the Student's Average Booklet Ratings With Standard Booklet Average Ratings

Standard Booklet Number	CHECK PILOT												Standard Booklet Average Scores	
	1	2	3	4	5	6	7	8	9	10				
1	82	84	88										85	
2	72	75	80										72	
3	76	70	77										74	
4	97	94	99										97	
5	36	32	30										33	
6	45	46	44										45	
7	81	81	82										81	
8	79	80	81										80	
9	88	86	85										86	
10	55	59	55										56	
Average Score for CP	71	71	71										71	Over-all Standard Average

Figure 9

student check pilot's deviation. The individual segment ratings of all student check pilots should be examined to ensure that they agree closely with the ratings of the experienced check pilots. However, no additional training may be necessary if the scoring problem can be solved from data inspection. In the event that all students qualify within three points of the standard rating, further standardization training with the standard booklets is optional. These students can be considered acceptable in terms of the uniformity of standards they are applying in grading students. In general, the greater the uniformity of standards attained, the more trustworthy will be the flight check grades assigned by the check pilots.

These steps should be completed for all 10 Primary and 10 Basic standard booklets. It will require 4 to 6 hrs. of discussion, but the time will be well invested, for this is the heart of the method for increasing uniformity of standards in the check-pilot training program.

e. Scheduling: Should be arranged to provide unbroken sessions.

5. In-flight buddy-ride practice

a. Purpose:

(1) To gain practice in safe and practical application of the PPDR.

(2) To identify problem areas check pilots may meet.

b. Time:

(1) A total of about 12 hrs. of flying time, to include four Primary and four Basic rides per student check pilot, is recommended. On two of the Primary PPDR rides the student check pilot imitates a student for his buddy-pilot to evaluate; on the other two rides he serves as the check pilot. The same practice requirement holds true for the Basic PPDR.

(2) Two 1 1/2 hr. discussion periods, as needed, for the two student check pilots to review these buddy-ride periods with an experienced check pilot.

c. Materials required: Copies of Primary and Basic PPDR's and PPDR Handbook.

d. Content:

(1) All Primary PPDR buddy-rides should be administered first; then, a 1 1/2 hr. period should be set aside to discuss and resolve problems.

(2) Next, the Basic PPDR buddy-rides should be administered and followed by a similar discussion to resolve problems identified during the practice rides.

e. Scheduling: As needed.

6. Check-pilot standardization rides

a. Purpose: To increase the uniformity of standards applied during marking of student performance and to determine the student check pilot's competence as safety pilot.

b. Time: Approximately 3 hrs. of flight time per student check pilot for two final standardization rides (1 1/2 hrs. on the Primary and 1 1/2 hrs. on the Basic PPDR) with the standardization instructor.

c. Materials required: Copies of Primary and Basic PPDR's and PPDR Handbook.

d. Content: The standardization instructor will imitate student performance, committing certain errors and determining whether the student check pilot records them accurately. The instructor must also determine whether the student check pilot can administer the PPDR safely.

With uniformity of standards and safety as the primary considerations, the instructor should continue to fly with each student check pilot until he determines either that the student check pilot has reached a satisfactory level of standardization and safety, or that the student check pilot is not qualified to administer the PPDR.

e. Scheduling: As needed.

7. Practice with actual students

a. Purpose: To resolve any further questions regarding the administration and scoring of the PPDR and to test safety of administration in work with actual students.

b. Time:

(1) Time required for each student check pilot to administer three Primary and three Basic PPDR's to students: 1 1/2 hrs. per check ride.

(2) Three hours of discussion by all student check pilots, 1 1/2 hrs. following the administration of the Primary PPDR, and 1 1/2 hrs. following the administration of the Basic PPDR.

c. Materials required: Copies of Primary and Basic PPDR's.

d. Content: After administering the PPDR, the student check pilot should score his own check rides, and at least one ride from a fellow student check pilot to obtain a cross-examination of his marking of the PPDR. The standardization pilot should carefully review at least one Primary and one Basic PPDR for each student check pilot. These two cross-checks should reveal any marking discrepancies among the group.

e. Scheduling: Scheduled as usual check ride.

8. Final selection of PPDR check pilots

a. Purpose: To provide a basis for eliminating student check pilots whose standards have not become sufficiently uniform as a result of the check-pilot training program, and who, consequently, must be either eliminated or given further training.

b. Time: About 8 hrs.—the time required for scoring and analyzing an additional set of 10 Primary and 10 Basic standard PPDR's.

c. Materials required: 10 standard Primary and 10 standard Basic PPDR's.

d. Content:

(1) A second set of 10 completed Primary and 10 completed Basic PPDR booklets, different from the standard set used earlier, are scored by each of the student check pilots. This second set of marked booklets should have been previously graded by experts and a set of agreed upon scores obtained (see p. 19).

(2) These booklets should be analyzed in the same manner as the first group of standard booklets.

The criterion for graduation from the course is established in the same manner as described for processing the first 10 booklets. The student check pilot who has demonstrated his flight proficiency and has achieved a satisfactory degree of standardization as indicated by his performance on grading the 10 standard booklets may be presumed to be ready to begin active participation as a check pilot.

A student check pilot may satisfy the training requirements on either the Primary or the Basic PPDR. When this is the case, he should be qualified only on the PPDR (Primary or Basic) on which he has met the criterion. Additional training should be required for the PPDR on which the student check pilot did not qualify.

Subsequently, the standardization supervisor should further monitor each check pilot's administration of the PPDR. He should periodically compare the frequency of different kinds of errors each check pilot records in order to detect and correct deviations that are indicative of nonstandardization. The manner in which this monitoring is conducted at the USAPHS is discussed by Duffy and Colgan.[1]

e. Scheduling: An unbroken block of time.

[1]See Reference 3.

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AND
APPENDICES

REFERENCES

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Appendix A

PERFORMANCE SCALES AND SCALE DEFINITIONS AS USED IN HELICOPTER FLIGHT EVALUATION

The PPDR scales defined and illustrated herein are designed to provide a standardized record of student performance. The scales are classed as either objective, relatively objective, or subjective. The objective scales (e.g., instrument readings, relation of helicopter to ground) measure aspects of performance that can be defined unequivocally. The subjective scales (e.g., approach angle, area selection), on the other hand, measure aspects of performance that must be judged by the observer (check pilot). It is extremely important to establish a common basis for relating student performance to the marking of the subjective scales; this should form the nucleus of the check-pilot training program.

The PPDR is used to provide a record of what actually happened during the check ride. In marking the performance scales, the check pilot must not make allowances for extraneous factors such as type of aircraft, wind, and weather. These factors are recorded before and after the check ride on the front page of the PPDR booklet and are taken into consideration when interpreting the over-all record to evaluate the student's performance. Extraneous factors that may affect only one maneuver or even just a segment of a maneuver, as well as the pattern of errors on successive performance items, are taken into account when the check pilot scores the items (see items 18, 39, 50, and 62 in Figure 4, p. 6).

An effective, rapid pattern for scanning the referents inside and outside the cockpit for marking the PPDR scales should be developed during check-pilot training. This will make it easier for the check pilot to mark the scales and thus will allow him more time for observing the student's performance.

The scales have the same general format, whatever their content. A black or outlined triangle is provided on each scale. This triangle should be marked if performance is within non-error limits. It is referred to in all scale descriptions as the proper triangle, or more simply, proper.

Approximately half of the scales are used in the same manner, in both the Primary and the Basic PPDR's; these are described under the Primary PPDR. A few scales are used in both portions of training but in a somewhat different manner, and are described in both sections. The remaining scales occur only in Primary or Basic evaluations.

PRIMARY PPDR SCALE DESCRIPTIONS

I. Objective Scales[1]

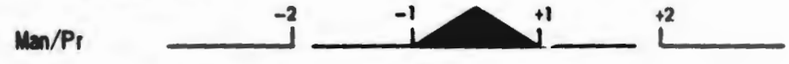
A. Objective: With Instrument Referents

Only four scales use instrument referents. These occur frequently, however, and constitute approximately 1/3 of the scales in the Primary PPDR. The four scales are:

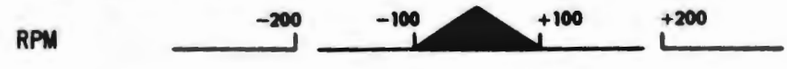
1. Altitude

* 2. Air Speed

3. Manifold Pressure



* 4. Revolutions per Minute



The center triangle covers that part of the scale which has been determined to be within "non-error" limits (hereinafter referred to as proper). All deviations outside of the triangle (errors) are recorded on the scale, at a point as close to the actual instrument deviation as the check pilot can manage (see Figure 5-B and discussion of marking instructions on p. 10).

Although these four scales are the most objective in the two PPDR's, check-pilot differences still influence the frequency with which errors are marked.[2] Two other factors bear on the problem:

(1) Differences in scan effectiveness.
(2) Differences in interpretation as to when a deviation was caused by weather or some external factor rather than student proficiency.

B. Relatively Objective: With Outside Referents

The 13 relatively objective PPDR scales depend on outside cues which are reasonably clear and specific. The term "relatively objective" is used because an element of subjectivity is present in the application of these scales. The scales are:

[1]Scales with asterisk occur in the Basic PPDR also.

[2]In test of early versions of the two PPDR's in 1957, the markings of six check pilots on the RPM scale (based on at least 10 student rides per check pilot) were analyzed; the frequency with which RPM errors were marked ranged from 14% to 28% for the six pilots. This range for 12 check pilots in a similar test made in 1958 was 12% to 35%. Differences of these magnitudes and in the range of errors recorded cannot be attributed to differences in the students observed by the check pilots, as the students were assigned on a random basis. Differences in check-pilot standards appeared to account for most of this problem. The intensive standardization training for check pilots as outlined in this Handbook is directed at reducing these differences.

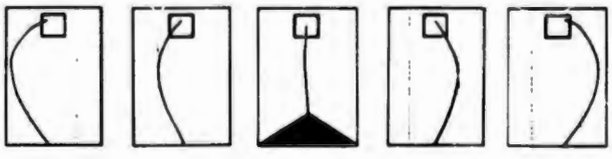
* 1. End Descent

End/Desc

At the end of an approach descent, if the helicopter is 3 ft. behind and 3 ft. above the panel, the proper triangle is marked. If the end descent point is more than 3 ft., but within one helicopter length of the panel, the helicopter diagram is marked on the side of proper corresponding to the error. If the end descent point is more than one helicopter length away, Short or Over is marked. A student will sometimes terminate at the appropriate altitude but short of the panel, then "creep" up to it. The End/Desc scale should be marked according to where the actual descent reached the 3 ft. altitude, not where the student stopped creeping forward. When the student terminates at a 5-6 ft. hover and then descends vertically to the panel, a slash mark is made through the Over rectangle.

2. Flight Path

Flight Path



The proper triangle is marked when the approach descent is generally down the center of the lane. If the flight path deviates to the right or left boundary of the lane, the right or left diagram adjacent to proper is marked. The diagram on the extreme right or left is marked if the helicopter flight path is outside the right or left lane boundary.

3. Ground Track (Lane)

Grnd/Trk

This scale is used only on final legs, takeoffs, and after roll-out from 180° autorotations. The proper triangle is marked to record a flight path which is over the approach lane. The two helicopter diagrams are used to record a deviation which is outside the boundaries of the lane, but not enough to be over the boundaries of one of the adjacent lanes. If the helicopter crosses the boundary of an adjacent lane (or the dividing line between the patterns on the field), mark Left Lane or Right Lane depending on the direction of error. When there is no adjacent lane on either or both sides of the one being used, the check pilot must judge whether the flight path has deviated enough to warrant either a moderate or an extreme error mark.

* 4. Ground Track (Left-Right)

This scale differs from the preceding scale in that it uses the approach lane as an outside referent. This scale is used to record the path of the helicopter in the following situations:

(a) During preparation for a 180° autorotation, after touchdown from autorotation, running landing, and forced landing: If the track of the helicopter after autorotation or running landing begins on and continues close to the center line, the proper triangle is marked. If the track begins near or drifts toward, but does not touch, the lane boundary, the helicopter adjacent to proper corresponding to the direction of the error is marked. If the helicopter track starts or drifts to the boundary of the lane, Left or Right is marked to correspond with the error. On forced landing touchdowns, the check pilot must evaluate the touchdown ground track in a similar manner.

(b) Downwind leg: In this application, Left or Right is marked to record very wide, potentially dangerous deviations from the proper downwind ground track; the two helicopters are marked for less extreme but noteworthy deviations.

* 5. Line of Descent

The proper triangle is marked to record a constant angular descent to the termination point. The diagram on the left is marked when the line of descent is "under-arced" (decreasing angle of descent), and the one on the right when "over-arced" (increasing angle of descent). Considerable emphasis on standardization will be required in order to obtain agreement among check pilots as to when a line of descent error is or is not being committed. Stair-stepped approach is recorded by marking both under and over.

6. Over-ride

This scale is marked to show whether the power is completely off for autorotative terminations. The check pilot can determine whether over-ride was held by the presence or absence of an engine surge as pitch is pulled prior to touchdown.

* 7. Pitch Creep

This scale is for the recording of the collective pitch position once autorotation has been entered. Mark Yes if the student allows the pitch to leave the full down position at any time during the autorotation.

* 8. Power

The use of power during running landings and take-offs is recorded on this scale. If the student has difficulty getting the helicopter off the ground or hits too hard at the end of his approach, mark Too Little. If excessive power is used, mark Too Much. Before the first running takeoff, determine the power limit that will serve as the referent for marking this scale.

9. Sight Picture

This scale is used to record the sight picture during all approaches. Mark the proper triangle if the sight picture is correct; if otherwise, mark Steep or Shallow. This scale applies only to the entry phase of the approach; the line of descent is recorded on a separate scale described in scale 5.

* 10. Skids

This scale records the lateral attitude of the helicopter at touchdown in hovering autorotations. Mark the proper triangle if the touchdown is level. Mark the left helicopter if left skid is low, or the right helicopter if the right skid is low.

* 11. Touchdown Attitude

This scale, similar to 10, is used to record the fore-and-aft attitude of the helicopter in all autorotation terminations and running landing touchdowns. Marking of this scale is the same as in the skid scale except that fore-and-aft rather than lateral attitude is recorded.

* 12. Touch Point

This scale is used to record distance from the intended point of touchdown at termination of running landings, 180° autorotations, and forced landings. If the student touches ground within one helicopter length of the intended point, mark the proper triangle; if between one and two helicopter lengths, mark the helicopter corresponding to the error; if two or more lengths, mark Short or Over.

13. Rotor RPM

This scale is used to record rotor RPM during the 180° autorotation. Normal (for the H-23) is 360-365 RPM. Above 370 mark High, below 355 mark Low.

II. Subjective Scales

The subjective scales constitute approximately 50 percent of the Primary PPDR. They require the most rigorous standardization training because they involve more check-pilot judgment than the objective scales and relatively objective scales already described. In most instances there are few specifiable referents for the judgments required.

Continual discussion of flight standards among check pilots and the standardization pilot will result in substantial agreement in recording student performance on these scales. However, due to basic human variability, not all differences will be eliminated. Occasional transient disagreements will not seriously distort the performance record, but lack of uniform standards or initial impressions which are allowed to affect overall scores may result in consistent or systematic biases and reduce reliability. In a quality control program, such biases will particularly affect the frequency of specific errors. The results of the training analysis will then reflect check-pilot biases rather than student performance, thereby misleading the supervisor. Consequently, special emphasis should be given to the subjective scales in the standardization program.[1]

The subjective scales are as follows:

* 1. Air Speed Increase

[1]Standardized evaluation of flight components is as important for the traditional, totally subjective flight proficiency method as for the PPDR method. The main difference is that in the traditional system, the effects of nonstandardization are not as easily and specifically identifiable. Consequently, it is more difficult to remedy such nonstandardization under the traditional system. This is one of the reasons that, in numerous instances, subjective flight grading has proved unreliable.

This scale is used to record the air speed increase required during the maximum performance takeoffs, running takeoffs, and climb-out following the power recovery from a forced landing. If the increase is a smooth, positive build to the desired air speed, mark the proper triangle; otherwise, mark Slow or Fast as the case may be. Erratic performance is recorded by marking both Slow and Fast.

2. Air Speed Reduction

This scale records reduction of air speed during the base turn and base leg in the traffic pattern. Mark Slow if the initial reduction in air speed is slow; mark Fast if it is fast. A very erratic (slow-fast) initial air speed reduction is recorded by marking both Slow and Fast. This scale refers only to the initial period of air speed reduction.

3. Altitude

This scale is used to record helicopter altitude during hovering and termination of normal and steep approaches. It is based upon 3 ft. as the proper altitude. The check pilot marks the scale at the number corresponding to his estimate of the helicopter height above ground. During check-pilot standardization, agreement as to the proper altitude should be reached.

4. Amount of Turn

This scale is used only to record the timeliness of roll-out from the downwind turn. The proper triangle is marked if the roll-out is properly timed and the downwind ground track parallels the takeoff lane. Mark a helicopter for moderate misjudgments, and Short or Over for excessive misjudgments.

* 5. Approach

This scale is used to record safe control of autorotation into an intended forced landing area. If the helicopter limits are exceeded or if the intended landing area is missed, mark Undershot or Overshot. The helicopter limits must be firmly established during check-pilot standardization.

* 6. Area Selection

The proper triangle is marked only if the best available area is selected in forced landings. Mark Poor if the selected area is considered unsafe; otherwise, mark Adequate.

* 7. Break

This scale records the student's application of pitch and power during maximum performance takeoffs. The proper triangle is marked if power is applied smoothly and positively. Mark Slow if ascent is slow; mark Abrupt if pitch and power application is fast and initial ascent is too rapid.

* 8. Cyclic

This scale is provided to record overcontrol of the cyclic during the taxi phase, during flight to 50 ft. in running takeoffs, and during sideward and rearward hovering.

9. Descent

This scale records the rate of altitude loss during the base leg descent. Mark proper if the base leg descent is uniform. If final turn altitude is reached before final turn, mark Fast; if final turn altitude is too high, mark Slow. During check-pilot standardization, agreement on tolerance for proper should be reached.

* 10. Rate of Descent

This scale records the descent rate in forced landings, considering climatic conditions for the day. If rate of descent is excessive, mark Fast. If rate of descent is slow mark Slow.

* 11. Drifts

In all hovering and hovering autorotation maneuvers, helicopter drift is recorded on this scale. Drift up to 3 ft. of a

preset point is marked proper, 3 to 4 ft. is marked Moderate, and over 4 ft. is marked Excessive.

* 12. Ground Speed

This scale records the movement of the helicopter over the ground in:

(a) Autorotative touchdowns, forced landings, and descent to power-recovery in forced landings: Mark proper if the ground speed is fast enough to allow controlled termination of the descent, but not too fast for the condition of the ground.

(b) Hovering: Mark proper if sideward hovering is not faster than the speed of normal walk; rearward hovering is usually slower than sideward. Erratic control of hovering speed is recorded by marking through both Too Slow and Too Fast.

* 13. Landing

This scale records the ground contact at the termination of all autorotations and running landings. Bounced is marked if the skids leave the ground after initial contact. Too Hard is marked when the landing is hard but no bounce occurs.

* 14. Lowers Pitch

This scale is used to record the rate of lowering pitch in forced landings. Mark Abrupt if the pitch is lowered rapidly, causing an erratic transition from powered to autorotative flight. Mark Slow if excessive rotor RPM is lost and the rotor tachometer needle is below the desired range.

* 15. Pitch Reduction

This scale is used to record the rate of lowering pitch in slope operations. Mark Fast if pitch reduction is so rapid that the student cannot compensate with cyclic pressures toward the slope to prevent the helicopter from sliding down slope during and after touchdown. Mark Slow if pitch changes are erratic—not smooth but fluctuating.

16. Nose

This scale is used to record the nose attitude of the helicopter during takeoffs. Mark the proper triangle if a slow and constant gain of air speed and altitude is achieved (up to 40 knots and 70 to 100 ft. for normal takeoff; up to 30 knots and 150 ft. for maximum takeoff; up to 40 knots and 10 ft. for running takeoff). If the air speed gain is otherwise, mark the left helicopter for a nose-low attitude (fast air speed gain) and the right helicopter for a nose-high attitude (slow air speed gain).

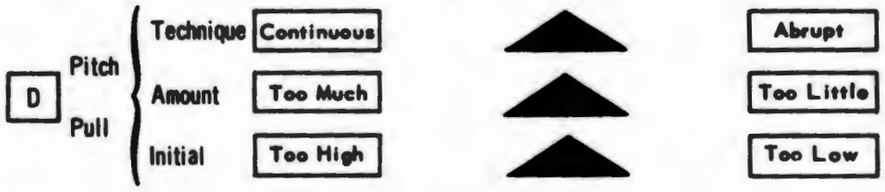
* 17. Pitch Application

This scale records the application of pitch (as power is increased to full-on) immediately following ground break during the maximum performance takeoff. Mark Slow if the helicopter "hangs" in the air without a reasonable rate of ascent; mark Fast if the ascent is jerky, noncoordinated (possibly with low RPM), and in an attitude that is difficult to control.

* 18. Pedals

Generally, this scale records the trim of the helicopter with respect to the power setting. Mark the left arrow if excessive left pedal or insufficient right pedal is being used; mark the right arrow if vice versa. At a general level, this scale should be interpreted as a mark in the right arrow means the nose of the aircraft is being held to the right of the proper position.

* 19. Pitch Pull



This triple scale records three aspects of pitch pull in all autorotations (excluding forced landings to a power recovery). Mark the proper triangle of the Initial scale if pitch is first pulled 10-15 ft. above the ground. Mark the proper triangle of the Amount scale if the landing is smooth. Mark the proper triangle of the Technique scale if the landing is cushioned; mark continuous if the aircraft is held off the ground and then falls through; mark abrupt if a balloon effect is noted. Standardizing the relation

between student performance and the recording on these scales requires considerable emphasis during check-pilot training.

20. Power Application

This scale records only the application of power to effect a power recovery from an aborted forced landing. Mark proper if the application of power is smooth and not too slow. Mark Abrupt if power application is too quick or too jerky. Mark Slow if the aircraft is too near the ground before power is applied.

* 21. Power Reduction

This scale records the reduction from a full to a normal power setting following a maximum performance takeoff. The proper triangle, Slow, or Abrupt is marked according to how the power reduction is accomplished. An erratic reduction of power is recorded by marking both Slow and Abrupt.

22. Rate

This scale records the rate of hovering turns. Proper is marked if the turn rate is slow and constant; both Slow and Fast are marked if the turn rate is erratic. Slow or Fast is marked if the turn rate is either too slow or too fast.

* 23. Rate of Closure

This scale records the rate of descent in normal approaches and in the last 50 ft. of the normal, shallow (running landing), and steep approaches. Mark the proper triangle if the perceived ground speed is that of a man walking. Erratic rates of closure require marks through both Slow and Fast.

* 24. Taxi Speed

This scale records the acceleration to the taxi speed required for translational lift in running takeoffs. Mark Slow if the acceleration requires an excessive taxi distance to effect the takeoff. Mark Fast if the speed effects a dangerously nose-low attitude or causes the helicopter to remain on the ground after

translational lift has been attained. Erratic control of the taxi speed requires marks through both Slow and Fast.

* 25. Turns

This scale records the timing of the initial turn in 180° autorotations and in forced landings. Mark Too Early if the helicopter overshoots the intended touchdown point. Mark Too Late if a very steep bank is required in the final part of the turn, or if the helicopter undershoots the intended touchdown point.

* 26. Air Speed

Applied in forced landings and 180° autorotative descents, this scale records the air speed selected to reach an intended landing spot. Mark the proper triangle if the air speed is 40-45 knots throughout the autorotative turn.

* 27. Touchdown Spot

Mark the proper triangle if the area is suitable for landing; mark Unsatisfactory if otherwise.

28. Throttle Closed

This scale is used in autorotative descents. Mark Slow if throttle is eased off in such a manner that there is a drop in rotor RPM. Mark Fast if closing of throttle is abrupt so that there is danger of stopping the engine.

BASIC PPDR SCALE DESCRIPTIONS

I. Objective Scales

A. Objective; With Instrument Referents: Same as the asterisked instrument scales presented on page 35 of Appendix A.

B. Relatively Objective; With Outside Referents: Same as the asterisked scales presented on pages 37-40 of Appendix A with the addition of the following scale.

1. Mast Bumping

Mark Yes if the hub bumps the mast during slope landings.

II. Subjective Scales

The many scales common to both PPDR's whose application is generally the same will not be described further. These asterisked scales are presented on the pages just preceding and the descriptions there apply as well to the Basic PPDR. Where a scale has been covered in the Primary PPDR but has a unique application in the Basic PPDR, it will be described separately here.

1. Observation/ Angle of Sight

2. Wind/ Forced Landing Areas

These scales, in combination, record the high reconnaissance phase of confined area, road, and pinnacle operations. Mark proper on the Observation / Angle of Sight scale if the selected flight path provides the best opportunity to view the area (considering the location of barriers, likelihood of slope, presence of small trees in the area, etc.). At the same time, if the flight path provides maximum advantage for reaching possible forced landing areas during high reconnaissance, mark proper on the Wind/ Forced Landing Areas scale; mark Adequate to record a less advantageous path, and Poor if the flight path is unnecessarily out of range of a forced landing area. The standardization supervisor must work closely with all check pilots to arrive at a common frame of reference for marking these scales.

3. Wind/ Direction and Velocity

4. Barriers / Location and Height

5. Size and Shape of Area

6. Forced Landing Areas

These four scales are used to record the approach path when entering confined areas. Mark the proper triangle of

the four scales if the selected approach path is the best compromise of wind direction, location and height of barriers, size and shape of the area, and location of forced landing areas. If, for example, it is impossible to select an approach path which will allow entry into the area and still take advantage of forced landing areas, then the Forced Landing Areas scale should be marked proper despite the fact that none were available. If a student selects a flight path which does in fact take complete advantage of available forced landing areas, but he places the approach in jeopardy (considering barriers, wind, or shape of area), then mark the Forced Landing Areas scale proper and other scales either Poor or Adequate to record this misjudgment. For safety reasons these scales are recorded after the student has touched down in the confined area.

7. Hovering Plan

This scale records the intended procedure for hovering the helicopter from the touchdown point to the best takeoff position in a confined area. Mark Poor if the hovering plan is considered unsafe, and proper if the plan is the best possible solution; if neither Poor nor proper mark Adequate. Confined areas differ in the problem faced in moving the helicopter to the takeoff position; that is, marking a path for rearward hovering will be required in some areas, whereas in other areas this will not be necessary.

8. Intended Takeoff Spot

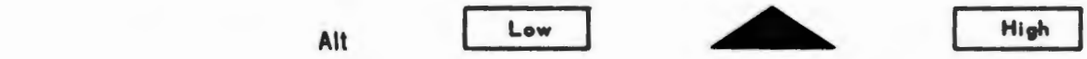
This scale is used to record the adequacy of the selected takeoff spot in confined area, pinnacle operations, and road operations. The student designates his intended takeoff spot to the check pilot before moving the helicopter. Mark the proper triangle if the intended takeoff spot is the best one possible. Mark Poor if the spot selected is not safe and another takeoff spot is designated by the student or check pilot as a result of the initial query. Otherwise, mark Adequate. This scale is marked only on the basis of the takeoff spot initially designated by the student.

9. Intended Takeoff Path

This scale is used to record the adequacy of the path the student intends to use in leaving the confined area. The student designates his intended takeoff spot. The marking of this scale must take into consideration the wind direction, size and

shape of the area, the height and location of the barriers, and the location of forced landing areas in the vicinity of the confined area (which the student should have noted during the high reconnaissance). Mark proper, Adequate, or Poor as in the preceding scale.

10. Altitude



This scale is used in a number of different situations in the Basic PPDR. Mark High or Low if the altitude selected is improper for the particular situation as defined below. If the altitude is erratic, mark both High and Low. A common frame of reference must be established among the check pilots during standardization training.

(a) In the high reconnaissance phase of confined area, pinnacle, and road operations, the correct altitude is defined by location of forced landing areas, angle of sight to the approach area, and altitude for observation.

(b) In terminating the confined area, pinnacle, and barrier approach, the proper hovering altitude depends on existing terrain features.

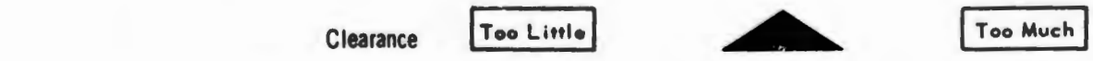
(c) In executing the hovering plan, the altitude used depends on existing terrain features.

(d) In the optional barrier operations, the scale is used for recording altitude during the crosswind, downwind, and base legs of the traffic pattern.

11. Ascent Line

This scale records the line of ascent in confined area and barrier takeoffs. The ascent line should be judged in terms of a projected line from the takeoff point to the top of the barrier. As with the use of the Line of Descent scale (see Appendix A, p. 38), the ascent line may be described as "under-arced" or "over-arced" and the applicable diagram should be marked. A stair-stepped ascent is recorded by marking both Too Little and Too Much.

12. Clearance



This scale records adequacy of barrier clearance in confined area and barrier approaches. Generally, safety is primarily considered in determining the adequacy of the clearance; if it is less than 10 ft., mark Too Little; if more than 25 ft., mark Too Much.

13. Flight Path

This scale is used to record the helicopter's actual flight path. Mark proper if the best possible flight path is used, and Poor if it is unsatisfactory or unsafe; otherwise, mark Adequate. The applicable situations are takeoff path in confined area, pinnacle, and road operations. In these situations, a compromise between wind direction and availability of forced landing areas must be made. Do not confuse the actual flight path recorded on this scale with the intended flight path (scale 9).

14. Pitch Application

This scale records the application of pitch during the pickup to a hover and touchdown from a hover in a slope operation. The check pilot must apply his experience in marking the scale to describe student performance.

15. Approach Angle

This scale is used to record the angle of approach to confined areas, pinnacles, and roads. The scale is used in the same manner as the Sight Picture scale of the Primary PPDR. The angle is determined by the barriers in relation to the intended touchdown spot, or by the condition being simulated (e.g., loads during road operations). The angle selected must be a sound compromise between barrier height, the intended touchdown spot, and the safe operating limits of the helicopter.

Appendix B

DESCRIPTION AND USE OF LAYOUT FOR BARRIER TAKEOFFS AND APPROACHES

In the event that check rides must be conducted in an area where access to barriers for training purposes is limited, the following barrier operation can be utilized.

The requirements for the barrier operation are:

1. A tree approximately 40 ft. in height, with an area around it cleared for at least 200 ft. in all directions.

2. A set of four approach panels, placed in four corners of a square centered on the tree (Figure B-1, aerial view). The approach panels are permanently positioned so that the angle from the panel to a point 10 ft. above the top of the tree is approximately 16° (Figure B-1, transverse view).

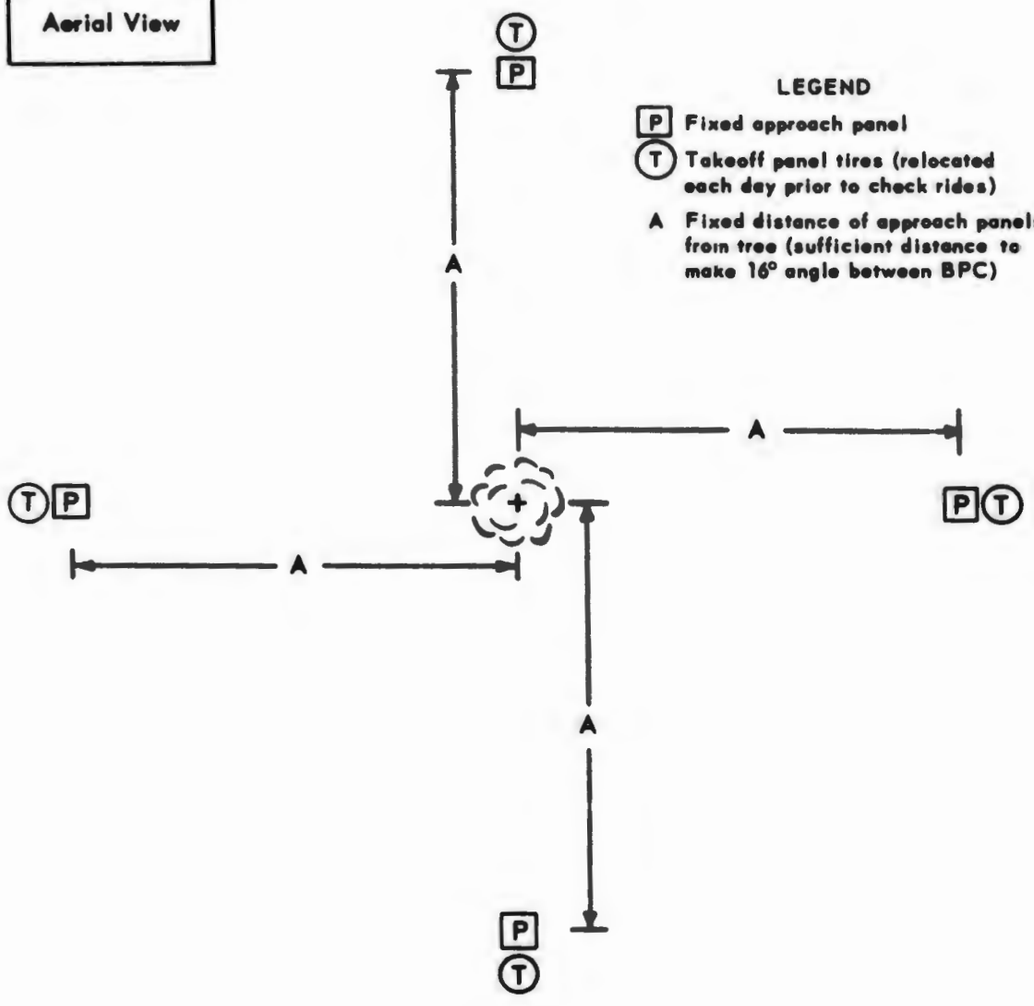
3. If H-23 B or C models are used in summer, an additional four takeoff panels are needed. (Movable rubber tires are excellent for this purpose.) These panels should be placed in line with the approach panels, at a point that will necessitate a maximum performance takeoff with only a minimum of power to spare yet allowing a safe ascent over the tree. Changes in load, wind, and aircraft power will require almost daily relocation of these takeoff panels. The check pilot should adjust them for the student according to density altitude, wind, and aircraft power conditions.

4. The takeoff is started from the ground directly behind the takeoff spot. A normal traffic pattern is flown, terminating after approaching over the tree to a point 3 ft. behind the approach panel, which remains permanently at a 16° angle from a point 10 ft. over the tree.

5. After the approach and takeoff into the wind are completed, the same sequence is followed on the more difficult crosswind takeoffs and approaches. This takeoff is set up by the check pilot hovering the helicopter to the crosswind takeoff spot after completing the barrier operation (into wind) maneuver.

Layout for Barrier Takeoffs

Aerial View



Transverse View

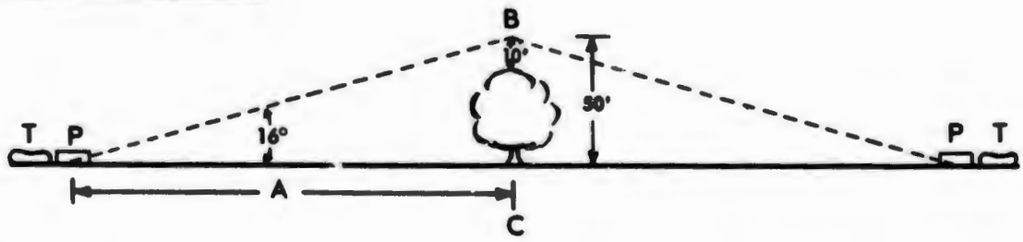


Figure B-1

Unclassified

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author)	2a. REPORT SECURITY CLASSIFICATION
Human Resources Research Office The George Washington University Alexandria, Virginia 22314	Unclassified
	2b. GROUP

3. REPORT TITLE

PPDR HANDBOOK: USE OF PILOT PERFORMANCE DESCRIPTION RECORD IN FLIGHT TRAINING QUALITY CONTROL

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13. ABSTRACT

This handbook provides a description of the Pilot Performance Description Record (PPDR), its characteristics, and general instructions for its use. It also offers a description of the check-pilot training program. An appendix contains a description of the Primary and Basic PPDR performance scales as used in helicopter flight evaluation.

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