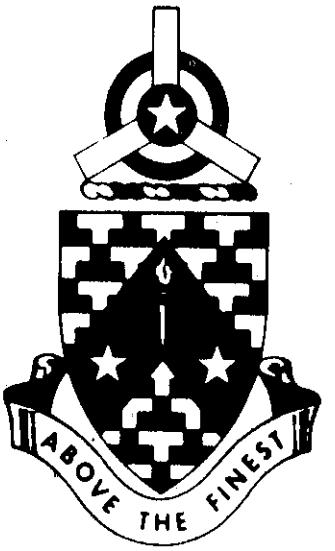
PROGRAMED TEXT

CLIMBS, TURNS AND DESCENTS

AM-39

Part I



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UNITED STATES ARMY

PRIMARY HELICOPTER SCHOOL

FORT WOLTERS, TEXAS

PROGRAMED TEXT

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FILE NO: AM-39 Part 1

PROGRAM TITLE CLIMBS, TURNS AND DESCENTS

POI SCOPE: Explanation of helicopter climbs, turns and descents.

INSTRUCTOR REFERENCES:

Primary Flight Training Manual (Fort Wolters) Sec III pg 2-7

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PREFACE

This program is designed to acquaint you with the procedure and common errors in performing helicopter climbs, turns, and descents.

This program will only tell you what to do and what to look for. Proficiency in the maneuver can only be gained in actual practice.

Start with frame 1 and work each frame in succession. Each frame will usually ask you a question. The correct answer is printed on the top of the next frame. If you were incorrect, turn back and restudy the information before continuing on to the next frame. When you have finished the text, complete the Self Evaluation Exercise. Now begin by studying the Performance Objectives on page iv.

This program supplements Fort Wolters Flight Training Film HS-21, Climbs, Turns, and Descents, OH-23; and HS-14, Climbs, Turns, and Descents, TH-55.

PERFORMANCE OBJECTIVES

Upon completion of this program, you will be able to list in proper sequence the steps required to perform climbs, descents and turns in a primary helicopter trainer.

FRAME 1

The helicopter controls discussed in this text are:

1. Cyclic
2. Collective
3. Pedals
4. Throttle

Remember: Movement of any one of the controls will require a corresponding movement of one or more of the other controls.

Crosscheck - This term simply means dividing your attention between the inside and outside of the helicopter. In other words dividing your time between instruments and attitude or flight path.

ALL OF YOUR SENSES COME INTO PLAY.

Example:

If you are watching your landing spot and you hear the engine change pitch, this should cue you to check the tachometer; then make the throttle correction.

TURN TO PAGE 3 FOR FRAME 2.

ANSWER: climb until the decreased power setting took effect.

FRAME 5

Complete the steps you would use to return to straight and level flight from a descent.

a. apply lift collective increase throttle
   when? approx. 50 ft above altitude

b. apply left pedal

c. apply cyclic forward

FRAME 2

Climbs

A climb is a maneuver to gain altitude at a controlled rate and attitude.

In the early portion of the pre-solo stage you will usually enter a normal climb from straight and level flight.

Procedures:

1. Apply slight aft pressure on the cyclic to raise the nose to a 40 knot climb attitude.

   (This will cause you to lose airspeed -so-)

2. Apply upward pressure on the collective pitch to establish a climb power setting.

   (You will have to increase throttle, or else lose engine RPM - your "ear" will tell you)

3. Apply a slight pressure on the left pedal to counteract the increased torque effect.

   (Your "eye" will show you the direction and amount of pedal needed.)

At a constant attitude, movement of the _____ will cause you to climb?

a. cyclic
b. collective
c. pedal
d. throttle

ANSWERS: a. apply upward pressure on the collective.
when? approximately 50 feet above desired altitude.
b. apply pressure on left pedal.
c. apply forward cyclic pressure.

NOTE: The altimeter has a slight amount of lag, so the initial application of collective pitch must be made before the altimeter actually shows the desired altitude to avoid passing below it. The amount of lead depends on the rate of descent.

FRAME 6

Level Turns

A turn is a maneuver used to change the heading of the helicopter.

Before you turn, CLEAR yourself. This means look in the direction of the turn (above, below, and at your flight level) to insure you won't collide with anything.

Procedures:

Apply a slight sideward pressure on the cyclic in the direction you wish to turn.

A very simple procedure, but here are some points to remember.

1. The further you move the cyclic, the more the bank and the faster the rate of turn.

2. Roll into your turn slowly.

3. Maintain a constant altitude and airspeed.

4. CROSSCHECK - altimeter, airspeed indicator, and continue to clear the area.

5. Don't lean your body into or away from the turn.

To return to straight and level flight, roll out of your turn

a. when you reach your desired heading.
b. slightly beyond your desired heading.
c. before your desired heading.

ANSWER: b. collective

FRAME 3

More on climbs

As you have seen, there are only a few simple steps involved in climbing a helicopter. The trick is in doing it smoothly, which takes practice.

To level off at the desired altitude

1. apply a slight forward pressure on the cyclic to a cruise attitude (start 50 feet below desired altitude - momentum plus your power setting will carry you up).

2. adjust collective (and throttle) to cruising manifold pressure.

3. apply a slight amount of right pedal.

Airspeed is a function of power setting and attitude. At a given power setting, gradual changes in attitude will yield gradual changes in airspeed.

a. True
b. False

ANSWER: c. Before your desired heading.

FRAME 7

Climbing Turns

A climbing turn is a maneuver used to change direction of flight while also climbing.

Before initiating the maneuver - clear yourself, make sure the area you are going to turn to is clear - take your time - relax.

Align the aircraft with a road, section line on the ground, or any other good terrain feature so that you can judge how far to turn. In the absence of good reference marks, you may make precision 90 degree turns by selecting a point directly out one door and simply turning to that point.

To establish a climbing turn, use the same procedure used to establish a normal climb; but as the nose rises, coordinate pressure laterally on the cyclic so the bank will be established simultaneously with the climb attitude. If perfectly established, the climb and bank attitudes will be attained at exactly the same time.

You have just initiated a climbing turn to the left, but you reach your climbing attitude before your correct bank attitude. You should

a. establish straight and level flight first and then try again.
b. land the aircraft and have maintenance check the controls.
c. Hold your climbing attitude and continue to establish your bank.

ANSWER: a. True

FRAME 4

Descents

A descent is a maneuver to lose altitude at a controlled rate while in a controlled attitude.

Steps:

1. Apply downward pressure on the collective and maintain proper RPM - (crosscheck !).

2 Apply pressure on the right pedal - (crosscheck!).

3. Apply a slight aft pressure to raise the nose to a 40 knot descending attitude. (CROSSCHECK)

NOTE: The three steps are accomplished almost simultaneously.

If you made the cyclic change first as in the climb maneuver, the helicopter would slow up and climb.

STOP TURN BACK TO PAGE 2 FOR FRAME 5.

ANSWER: c. Hold your climbing attitude and continue to establish your bank.

NOTE: Since the climb and bank attitudes are not always established simultaneously, hold whichever one that is attained first, then effect the other.

FRAME 8

Descending Turns

A descending turn is a maneuver used to change direction while also descending.

The procedures are almost the same as for a climbing turn.

a. Clear yourself.

b. Pick a point to turn to.

c. Lower collective and start your turn.

d. Cross check! (Outside, tachometer, altimeter, etc.)

e. Make small corrections - don't jockey!

After leveling off from your descending turn, you realize you are lower than your desired altitude, you should:

a. lower the nose to gain altitude.
b. raise the nose to gain altitude.
c. increase collective to gain altitude.

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ANSWER: c. Increase collective to gain altitude.

TURN TO SELF EVALUATION EXERCISE

SELF EVALUATION EXERCISE

1. To climb from straight and level, you should first

   a. apply upward pressure on the collective.
   b. apply slight pressure on the left pedal.
   c. increase throttle until your "ear" tells you there is enough power to climb.
   d. apply aft pressure on the cyclic to raise the nose to a climb attitude.

2. When you reduce throttle, you apply _____ pedal.

   a. right
   b. left
   c. both
   d. neither

3. Which of the following is true?

   a. Cyclic controls altitude, collective controls attitude.
   b. Pedals control direction in straight and level flight.
   c. Cyclic controls attitude, collective controls altitude.
   d. Throttle linkage connects the engine to the tail rotor.

4. Which of the following best describes crosscheck?

   a. Division of attention between the tachometer and the airspeed indicator.
   b. An angry Czechoslovakian.
   c. Division of attention among all the factors which affect the flight of the helicopter.
   d. Division of attention between the instructor pilot and the instruments.

5. Pedals are used:

   a. To assist turning at cruise
   b. To counteract torque caused by throttle changes
   c. To brace the pilot in steep turns
   d. None of the above

CLIMBS, TURNS AND DESCENTS
ANSWERS TO SELF EVALUATION EXERCISE

1. d
2. a
3. c
4. c
5. b

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