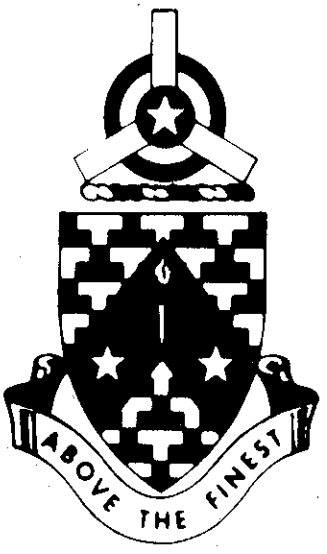
PROGRAMED TEXT

EMERGENCY PROCEDURES

AM-45



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FORT WOLTERS, TEXAS

PROGRAMED TEXT

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FILE NO: AM-45

PROGRAM TITLE EMERGENCY PROCEDURES

POI SCOPE: Explanation of helicopter emergency procedures.

INSTRUCTOR REFERENCES:

Primary Helicopter Flight Training Manual USAPHS,
Fort Wolters, Texas Sec VI

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PREFACE

This program is designed to enable you to learn the procedures used for the following helicopter emergencies; fire, RPM overspeeds, engine failure, and antitorque failure. The proper application of these procedures may save your life if you should encounter an emergency.

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.

PERFORMANCE OBJECTIVES

At the completion of this program you will be able to list in proper sequence the procedures used for the following helicopter emergencies: (1) fire, (2) RPM overspeeds, (3) engine failure, and (4) antitorque failure.

FRAME 1

A fire is always a serious problem in a helicopter. There are two types of fires which may be encountered.

1. Engine fire.

2. Electrical fire.

If you have an engine fire while starting, the emergency procedures are the same for the OH-23, OH-13, and TH-55.

1. Stop priming the engine.

2. Continue to engage starter, to attempt to draw the fire through the engine.

If the fire continues to spread:

1. Close fuel shut-off valve.

2. Shut all switches off.

3. Exit the helicopter and use the fire extinguisher.

The first thing to do if you have an engine fire while starting, is:

a. close fuel shut-off valve.
b. stop priming and continue to engage starter.
c. shut all switches off and exit aircraft.
d. use the fire extinguisher.

NOTE: Any time a flight emergency arises, use your radio to let somebody know about it if you have time. Your immediate action is to apply the appropriate emergency procedures, and then if at all possible, inform someone of your predicament and intentions.

ANSWER: a. lower the collective and enter autorotation first, then you can radio someone and tell them your problem.

FRAME 8

ANTI-TORQUE FAILURE FROM A HOVER

While at a hover, if the helicopter begins an uncontrolled turn to the right and the rate of turn increases rapidly, you have experienced an anti-torque system failure.

Immediately close the throttle. This will eliminate the torque and the turn will stop. At this point complete a hovering autorotation by cushioning the touchdown with collective pitch. It is important to keep the helicopter in a level attitude with cyclic.

If you are at a hover and the helicopter suddenly makes a rapidly increasing turn to the right:

a. immediately lower the collective.
b. immediately close the throttle.
c. immediately apply left cyclic.

ANSWER: b. stop priming and continue to engage the starter.

FRAME 2

If an engine fire occurs in flight, land immediately at the nearest clear area and shut the aircraft down in the same manner as stated in Frame 1. DO NOT ATTEMPT A RESTART.

The procedure for an electrical fire in flight is as follows:

1. a. OH-23, master switch off.
   b. OH-13 or TH-55, battery and generator switch off.
2. Land immediately at nearest clear area.
3. All switches off.
4. Follow normal shut-down procedures.

The procedure for an electrical fire on the ground is the same as in flight with the exception of accomplishing a landing.

If you have just made a precautionary landing due to an engine fire, you should:

a. attempt to restart engine if it appears there is little damage.
b. wait for assistance.

If you notice smoke coming from the radio compartment while you are flying, you should:

a. OH-23, turn master switch off.
   OH-13, TH-55, turn battery and generator switch off.
b. continue to fly and decrease RPM.
c. decrease throttle and autorotate to nearest landing area.

A helicopter is still capable of flight with electrical switches off.

a. True
b. False

ANSWER: b. immediately close the throttle.

FRAME 9

ANTI-TORQUE FAILURE IN FLIGHT

During flight an uncontrolled yaw or turn to the right would indicate an anti-torque system failure. Immediately close the throttle, lower the collective and establish an autorotation glide with at least 40 knots airspeed. Make a normal autorotation landing into the wind if possible. It is desirable to have some forward speed, at the time of ground contact. Never apply power during the landing. Lateral cyclic away from the turn will help to maintain directional control.

An indication of anti-torque failure in flight would be:

a. nose of aircraft suddenly turns to the left.
b. nose of aircraft suddenly turns to the right.

With an anti-torque failure you should attempt to land with:

a. no forward airspeed.
b. some forward airspeed.

If you have an anti-torque failure and you apply power during the landing, the nose of the helicopter will:

a. turn to the left.
b. remain straight.
c. turn to the right.

ANSWER: b. wait for assistance.
a. OH-23, turn master switch off.
OH-13, TH-55, turn battery and generator switch off.
a. True

FRAME 3

ENGINE OVERSPEEDS

Engine overspeeds exceed the design limitations of the helicopter engine and put an excessive strain on the internal parts of the engine which may cause an engine failure. Engine overspeeds can occur during engine starting procedures and normally happen because the throttle is above the first detent. You can also get an overspeed in flight by rapid and incorrect throttle and/or collective pitch movements. Usually engine overspeeds are caused by careless or incorrect procedures.

KNOW YOUR PROCEDURES

When an engine overspeed is experienced, the pilot must know if the RPM achieved allows him to continue and:

1. land at nearest stagefield and shut down.
-OR-
2. land at nearest clear area and shut down.

NOTE: Know the engine RPM limits for the type and model helicopter you are flying. You will find them on page VI-2 (OH-23) and VI-3 (TH-55) of your Flight Training Manual. Do not guess - KNOW!

Engine overspeeds may cause:

a. engine failure.
b. rotor blade damage.

ANSWER: b. nose of aircraft suddenly turns to the right.
b. some forward airspeed.
c. turn to the right.

FRAME 10

Any time you have an emergency, there are certain procedures you should follow:

1. If radio is operative notify heliport tower, stagefield control, or aircraft flying in vicinity.

2. Aircraft flying in the vicinity may be signaled by (OH-13, OH-23) aligning main rotor blades perpendicular to the fuselage. (TH-55) one blade straight out in front. In summer, place a white "T" shirt on the tip of one blade, in winter place a flight jacket, orange side out, on the tip of one blade.

3. Stay with the aircraft and don't attempt to fly the aircraft until it is inspected and released by qualified personnel.

If you have an emergency and landed without being able to notify anyone, you should:

a. (TH-55) put one blade straight out in front of helicopter. (OH-13, OH-23) align main rotor blade perpendicular with the fuselage.
b. (TH-55) put one blade straight out towards the rear of the helicopter. (OH-13, OH-23) align rotor blades (main) with fuselage.

You have just had an electrical fire and landed in the nearest clear area. After you have checked the damages and you think everything is okay you should:

a. fly back to main heliport.
b. stay with aircraft until help arrives.

ANSWER: a. engine failure.

FRAME 4

If you have experienced an engine overspeed, you must write it up in the aircraft log book (Form 2408-13) to prevent possible damage to the engine from going unnoticed. The write-up will only state:

1. amount of RPM overspeed.
2. length of time at that RPM.

EXAMPLE

Flt 1 - engine overspeed - 3500 RPM for 15 seconds. Chas Lindbergh.

You should know the engine RPM limitations:

a. before you are ready to solo.
b. only if you have an engine overspeed.

If you have an engine overspeed, you should:

a. write it up so the engine can be inspected.
b. only write it up if you think it was an excessive overspeed.

ANSWER: a. (TH-55) put one blade straight out in front of helicopter. (OH-13, OH-23) align main rotor blade perpendicular with the fuselage.
b. stay with aircraft until help arrives.

FRAME 11

A frozen throttle may occur at any power setting, from full power to reduced power. First, try to free the throttle by twisting it. Do this very carefully, for if the throttle does break free you might have an engine over-rev. Remember, while the throttle is frozen, RPM is maintained with the collective. Apply upward pressure on the collective to decrease RPM and downward pressure to increase RPM.

If it is necessary for you to decrease collective in order to maintain RPM, how would you attempt to maintain your altitude?

a. By applying aft cyclic.
b. By applying forward cyclic.
c. By varying RPM.
d. By increasing power.

ANSWER: a. before you are ready to solo.
a. write it up so the engine can be inspected.

Certain engine overspeeds require an engine inspection to determine the damage before further flight. Higher RPM overspeeds require engine replacement, so you can see that it can be a dangerous situation. Always write it up even if you are in doubt. Each person has a moral obligation to honestly record any overspeed experienced.

Remember your radio. Let someone know what has happened.

FRAME 5

ROTOR OVERSPEEDS

Rotor overspeeds may occur with needles joined in conjunction with an engine overspeed, however, a rotor overspeed is more likely to occur during the flare in a steep turn while in autorotation.

To prevent a rotor overspeed, raise the collective pitch a slight amount to reduce rotor RPM, then fully lower the collective when the RPM is at the correct setting.

A pilot should be most cautious of a rotor overspeed during:

a. straight and level flight.
b. descents.
c. autorotations.

If you experience a rotor overspeed you should immediately:

a. decrease collective pitch.
b. increase collective pitch.

ANSWER: a. Apply aft cyclic to maintain altitude.

Remember - your reduced airspeed resulting from the application of aft cyclic must not fall below the minimum safe airspeed, because a complete loss of translational lift could occur.

FRAME 12

If the frozen throttle cannot be corrected, the correct procedures are as follows:

1. Contact your controlling agency and advise them of your predicament.

2. Determine if a descent can be established without causing an engine overspeed.

3. If a descent can be established, a shallow approach to a running landing should be made at the nearest stagefield or facility. Maintain RPM with collective after touchdown, and shut off the magneto switch to stop the engine.

4. If a descent cannot be established without causing an overspeed, it will be necessary to perform an autorotation. The autorotation is initiated by turning off the magneto switch.

ANSWER: c. autorotation.
b. increase collective pitch, but remember, you must fully lower the collective when the RPM is at the correct setting again.

FRAME 6

Rotor overspeed limitations are also listed in the flight training manual along with the engine overspeed limitations. You must know the rotor speed limitations for your aircraft, and you must know if the rotor overspeed that has been achieved requires you to:

1. land at the nearest stagefield and shut down.

2. land at the nearest clear area and shut down.

Rotor overspeeds will be written up in the same manner as engine overspeeds.

A pilot will be able to learn the rotor RPM overspeed limitations for his aircraft by:

a. experience.
b. studying his flight training manual.

REMEMBER: Anytime you have any emergency, let someone know about it over the radio.

FRAME 13

In the case of a low time student who feels he is not proficient enough to perform an autorotation, he should experiment until he finds the shallowest angle of approach that will give him the minimum amount of overspeed and perform a running landing.

CONTINUE WITH THE SELF EVALUATION EXERCISE

ANSWER: b. studying his flight training manual. Rotor overspeed limitations are found in page VI-3 of your flight training manual.

FRAME 7

ENGINE FAILURE

Autorotations and simulated forced landings are designed to prepare you for the possibility of an engine failure. If an engine failure occurs, immediately enter autorotation and notify the heliport tower, stagefield control, or aircraft flying in vicinity. In addition to the procedures used in the simulated forced landings, the

1. fuel valve
2. mixture control lever
3. magneto switch
4. master switch

should be turn off <u>if time permits</u> before landing.

If you experience an engine failure, your primary concern should be:

(a) lower the collective and enter autorotation.
b. notify the heliport tower, stagefield control or aircraft flying in the vicinity.

STOP! RETURN TO PAGE 2 FRAME 8

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SELF EVALUATION EXERCISE

1. You have had an engine overspeed and are preparing to write it up. Which of the write-ups below would be correct?

   a. Engine overspeed-3700 RPM for a short period of time.
   b. Engine had overspeed for a period of 5 seconds.
   c. Engine overspeed-3450 RPM for approximately 15 seconds.
   d. Engine overspeed-3700 RPM, 20" of manifold pressure at 2000 feet for 10 seconds.

2. The two types of fire you would most likely encounter in a helicopter are:

   a. engine fire and structural fire.
   b. engine fire and electrical fire.
   c. electrical fire and structural fire.
   d. engine fire and airframe fire.

3. Engine overspeeds are normally caused by:

   a. poor throttle control linkage.
   b. abrupt decelerations.
   c. incorrect procedures and careless operation.
   d. low airspeed in autorotation.

4. Rotor overspeeds normally occur during :

   a. hovering flight.
   b. the flare and steep turns in autorotation.
   c during engine start procedures.
   d. straight and level flight.

5. An anti-torque system failure in flight will normally cause:

   a. a yaw or turn to the left.
   b. a yaw or turn to the right.
   c. a decrease in RPM.
   d. a decrease in airspeed.

6. Your immediate reaction to an anti-torque failure at a hover should be:

   a. apply collective to cushion the landing.
   b. close the throttle to stop torque effect.
   c. decrease collective to land immediately.
   d. apply left cyclic to stop turn.

7. When landing with an anti-torque failure, never :

   a. land with forward airspeed.
   b. apply power.
   c. increase collective pitch.
   d. use lateral cyclic to help maintain directional control.

8. If you have had an emergency in flight and have taken the necessary immediate action, you should then:

   a. attempt to notify someone with your radio of your situation before landing.
   b. attempt to notify someone with your radio after landing.
   c. align the rotor blades with the tail boom.
   d. return to a stage field for maintenance help.

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ANSWERS TO SELF EVALUATION EXERCISE

1. c
2. b
3. c
4. b
5. b
6. b
7. b
8. a

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