NAVAL AIR TRAINING COMMAND

NAS CORPUS CHRISTI, TEXAS **CNATRA P-424 (New 02-21)**

FLIGHT TRAINING INSTRUCTION

LOGISTICS ADVANCED PHASE TH-57

2021

DEPARTMENT OF THE NAVY
CHIEF OF NAVAL AIR TRAINING
250 LEXINGTON BLVD SUITE 102
CORPUS CHRISTI TX 78419-5041

CNATRA P-424
N714
25 Feb 21

CNATRA P-424 (NEW 02-21)

Subj: FLIGHT TRAINING INSTRUCTION, LOGISTICS ADVANCED PHASE, TH-57

1. CNATRA P-424 (New 02-21) PAT, "Flight Training Instruction, Logistics Advanced Phase, TH-57," is issued for information, standardization of instruction, and guidance to all flight instructors and student military aviators within the Naval Air Training Command.

2. This publication is an explanatory aid to the Helicopter curriculum and shall be the authority for the execution of all flight procedures and maneuvers herein contained.

3. Recommendations for changes shall be submitted via the electronic Training Change Request (TCR) form located on the CNATRA website.

4. CNATRA P-424 (New 02-21) PAT is a new publication.

D. F. WESTPHALL
By direction

Releasability and distribution:
This instruction is cleared for public release and is available electronically only via Chief of Naval Air Training Issuances Website, https://www.cnatra.navy.mil/pubs-pat-pubs.asp.

FLIGHT TRAINING INSTRUCTION

FOR

LOGISTICS ADVANCED PHASE

TH-57

Q-2C-3156

LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:
Original...0...25 Feb 21 (this will be the date issued)

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 40 CONSISTING OF THE FOLLOWING:

Page No.	**Change No.**	**Page No.**	**Change No.**
COVER	0		
LETTER	0		
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A-4 (blank)	0		

INTERIM CHANGE SUMMARY

The following Changes have been previously incorporated in this manual:

CHANGE NUMBER	REMARKS/PURPOSE

The following interim Changes have been incorporated in this Change/Revision:

INTERIM CHANGE NUMBER	REMARKS/PURPOSE	ENTERED BY	DATE

INTRODUCTION

This Flight Training Instruction provides you amplifying information covering Confined Area Landings, Dynamic Flight Maneuvers, Pinnacle Landings, and External Load Operations. Draw upon and apply the fundamentals from the previous modules of instruction to successfully complete this module. The objective of logistical operations is to show the versatility of helicopter operations within the fleet and various mission capabilities.

SCOPE

This publication contains maneuvers introduced in the logistics stage of the Advanced Helicopter Multi-Service Pilot Training System Master Curriculum Guide (CNATRAINST 1542.156 series). It is your responsibility to have a thorough knowledge of its contents.

CHANGE RECOMMENDATIONS

Change recommendations to this publication may be submitted by anyone to Commander Training Air Wing FIVE and CNATRA N7, a process which improves training curricula and its associated training publications. This includes all personnel involved at every level of flight training. A Training Change Request (TCR) form should be completed and submitted for routing to the standardization office of your respective squadron. Remember, no TCR is too small.

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HELICOPTER LZ OPERATIONS

100. INTRODUCTION

This chapter introduces the student to the basic fundamentals of helicopter logistical operations. The procedures contained herein are intended to provide a foundation which will meet most mission requirements.

101. GENERAL PRECAUTIONS FOR UNPREPARED LANDING ZONE OPERATIONS

Certain general rules apply to unprepared landings. Some of the more important of these rules are:

1. Know wind direction and approximate velocity at all times. Plan landings and takeoffs with this knowledge in mind.

2. Plan the flight path for approach and takeoff to take maximum advantage of forced landing areas.

3. Operate the helicopter as near to its normal capabilities as the situation allows. The angle of descent should be no steeper than necessary to clear existing barriers and to land on a preselected spot. Angle of climb in takeoff should be no steeper than necessary to clear all barriers in the takeoff path.

4. In order to minimize the effect of turbulence and to conserve power the helicopter should be hovered at a lower altitude than normal when in a confined area. High grass or weeds will decrease efficiency of ground effect; but hovering low or taking off from the ground will partially compensate for this loss of ground effect.

5. Make every landing to a specific point, not merely into a general area. The more confined the area, the more essential it is for the helicopter to be landed precisely upon a definite point. The landing point must be kept in sight during the final approach, particularly during the more critical final phase.

6. Consideration should be given to increases in terrain elevation between the point of original takeoff and subsequent areas of operation.

7. In entering any restricted area, judge the diameter of the main rotor system to ensure clearance, but remain especially alert to prevent possible damage to the tail rotor. Not only must the angle of descent over a barrier clear the tail rotor of all obstructions, but caution must be exercised on the ground to avoid swinging the tail rotor into trees, boulders, or other objects. The pilot is responsible for ensuring personnel remain clear of the tail rotor at all times.

8. Understanding the difference between "power required exceeds power available" and "vortex ring state" may save your life. Learn and understand what each one means.

a. "Power required exceeds power available" is a condition wherein the power required to maintain the current flight mode is in excess of the power available.

b. "Vortex ring state" is a condition of powered flight wherein the aircraft settles in its own downwash.

102. POWER CHECKS

Application

Power checks are designed to reduce the risk of power required exceeding power available (an emergency situation), and specifically in the TH-57, prevent an overtorque. These checks are conducted to determine the power available (the power the engine is capable of providing) and the power required (the power the airframe will need to provide in order to accomplish the planned operation).

Prior to any flight operation, power required to hover in and out of ground effect shall be calculated using the tables in NATOPS. HIGE and HOGE are used since they are some of the most demanding power required flight profiles.

For special missions like logistics, an additional in-zone ***operational power check*** is conducted to cross check ***calculated*** and ***actual*** power requirements prior to conducting any Confined Area Landing (CAL) or external load operations.

Power required is an expression (in torque) of how much power is needed to fly a given profile. Power required is influenced by gross weight, density altitude (DA) (pressure altitude, humidity, outside temperature), and airspeed/wind. If any of these inputs vary from what was used in calculation, the calculated and actual power required will not match. For example, if the aircraft is heavier than planned, actual hover torque (power required) will be greater than computed; if there is more wind than planned, actual hover torque will be less than computed; if DA is higher than planned, then hover torque will be higher than planned.

Power available is the power (in torque) the engine can produce without exceeding a limit at a given density altitude. In virtually all regimes, the power available in the TH-57 is torque limited - that is, the transmission torque/time limits will be exceeded before any engine limitation is reached if the engine is ***operating correctly***. Once engine performance parameters, turbine outlet temperature (TOT), and turbine speed (N_g), have been checked within limits, power available in the TH-57 can be assumed to be 85% (unlimited) and 100% (five minutes). Intentional operation in the 100 to 110 percent transient torque range is prohibited and shall not be used for planning.

During preflight planning, ensure a ten percent safety margin between HOGE power required (computed) and power available (100% Q). Burning down fuel to a specific state may be necessary to achieve this.

During the operational power check, actual torque required to HOGE shall not be greater than 90% torque before beginning CAL or external load operations. This allows a ten percent margin between power available (100%) and power required (actual HOGE) to permit maneuvering, prevent settling with the external load and mitigate loss of wind effect in a CAL.

Description

To conduct an operational power check, calculate the base HIGE/HOGE for a specific aircraft, fuel load and current environmental conditions (pressure altitude and temperature) ***on scene***. The charts to determine power required are located in the NATOPS Pocket Checklist (PCL). The checklist contains specific information on fuel loads, center of gravity, and HIGE/HOGE.

To determine the HIGE/HOGE requirements of the aircraft you will need the aircraft's Base Weight. ***Carry a copy of the weight and balance in the aircraft***. From this Base Weight, add the crew complement and current fuel load. Fuel weight is available in the PCL under the Reference Data section. The sum of base weight, crew and fuel provides current Operating Weight.

Next, determine current pressure altitude by setting the barometric altimeter to 29.92 and reading off the altitude.

With the pressure altitude and operating weight, use the PCL Hover Torque Required chart to determine base HIGE/HOGE information.

Verify the accuracy of the calculations by establishing a 5' AGL hover for a HIGE check and then a 50' AGL hover for HOGE check.

Common Errors and Safety Notes

1. If the actual power required during the operational check exceeds the calculated power required, do not continue with the planned operations until determining the cause. While errors in calculation or environmental variables differing from those used in preflight planning may account for the discrepancy between actual and calculated power required, a potentially hazardous cause may be that the aircraft gross weight is higher than the gross weight used in the planning phase. If actual power required exceeds calculated power required, and an incorrect gross weight is suspected to be the cause of the discrepancy, ensure that the current aircraft configuration is within proscribed gross weight and center-of-gravity limitations before proceeding with planned operations.

2. Conducting a power check in a hover at 50' AGL requires operating in the AVOID area of the Height Velocity Diagram. If a transition to forward flight is accomplished from a 50' hover, the profile will also involve operations in the AVOID area of the Height Velocity Diagram.

Protracted operations in the AVOID areas of the Height Velocity Diagram are prohibited and pilots should utilize caution in the performance of the hover power check and subsequent transition.

3. If descending from 50' AGL to a lower hover or to affect a landing, avoid excessive descent rates that may lead to power required exceeding power available or entry into vortex ring state conditions.

4. Ensure that the barometric altimeter is reset to last obtained value at the conclusion of the power check procedures.

103. DYNAMIC LANDING APPROACH (DLA)

DLA's are designed to expeditiously transition from the TERF environment to a landing. The intended point of landing may be a confined area, pinnacle, or open field. SWEEP checks will dictate pattern altitude, glideslope, and type of landing (or no landing). The following three DLA patterns are designed to assist the PAC in successfully transitioning to a landing regardless of the ingress heading in relation to the LZ.

104. 360º OVERHEAD APPROACH

Maneuver Description

The 360º Overhead Approach is used when visual acquisition of the LZ occurs on top, or nearly so and heading is into the wind. It may also be helpful when the LZ is situated in an urban environment. Overflight of the zone may be necessary if LZ imagery is not available or lacks fidelity.

Procedures

1. Perform a hover or no hover takeoff and transition to forward flight.

2. Make the crosswind turn upon reaching 100 feet AGL.

3. Turn as necessary to arrive over the intended point of landing at 200 feet AGL, 80 KIAS.

   – Maintain balanced flight throughout the pattern until intercepting the final course line.

4. Initiate the maneuver directly over, or slightly before, the intended landing point, remaining at 200 feet and 80 KIAS.

5. Commence a smooth, coordinated turn utilizing 30-45 degrees AOB to arrive at the 180° position, holding 200 feet and 80 KIAS.

6. From the 180° position, start a descending, decelerating, coordinated turn to arrive at the 90° position at 150 feet and 60 KIAS.

7. From the 90° position, continue the descending, decelerating, coordinated turn to intercept final at 100 feet and 45- 55 KIAS with 200-400 feet of final.

– Use “wing down, top rudder” to maintain a straight final approach course.

8. Enter a consistent glideslope not to exceed 45º.

– Visualize and maintain the glideslope, rate of closure and descent to the intended point of landing.

9. End the maneuver utilizing a vertical or no hover landing.

CAUTION

The radar altimeter indicates slant range. In a steep AOB it will indicate higher actual altitude. An outside scan is required and the RADALT will be used on final as back-up.

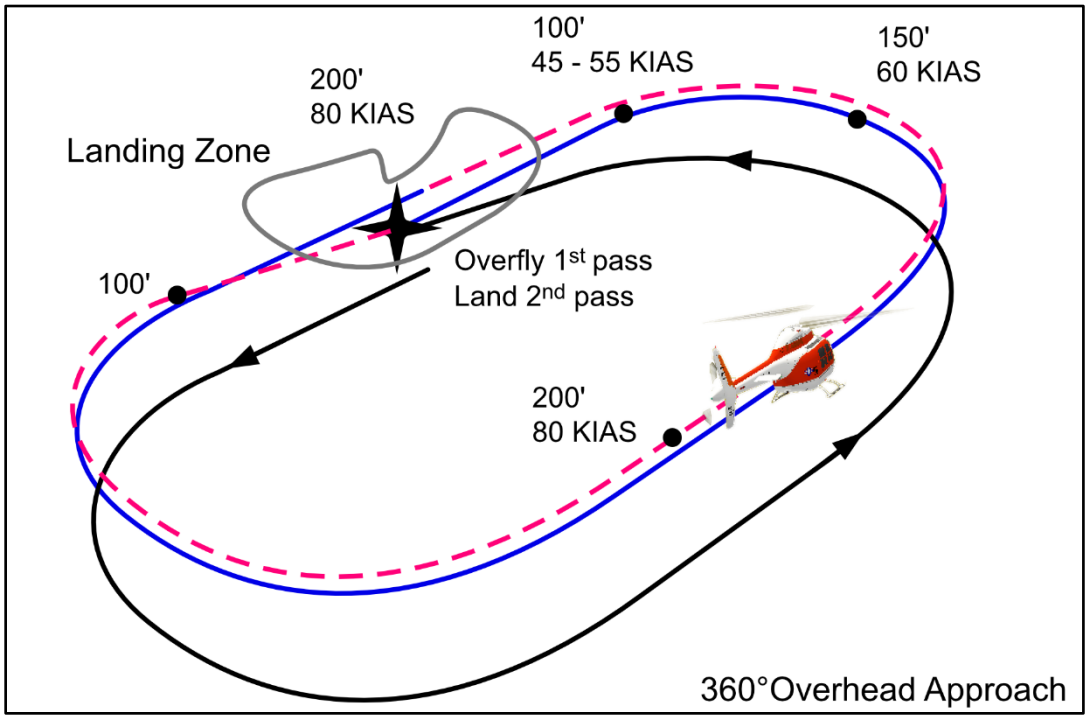

Figure 1-1 360° Overhead Approach

Amplification and Technique

AOB can be constant or vary between 30-45 degrees, realizing that a higher AOB will result in a tighter pattern, power required increases and more coordination is needed to arrive at the intended point of landing.

Common Errors and Safety Notes

1. Turning for downwind prior to reaching 100 feet.

2. Ballooning above pattern altitude or not reaching 80 KIAS.

3. Either too much or too little power reduction and/or over-controlling collective.

4. Using AOB other than what is required for the approach, or exceeding NATOPS AOB limitations.

5. Getting too shallow or steep on final, causing excessive collective, cyclic, and pedal movements, putting the aircraft in a potential overtorque situation.

6. Not acquiring and maintaining a vigilant scan to avoid all obstacles.

105. 180º OFFSET APPROACH

Maneuver Description

The 180º Offset Approach is used when the ingress heading is 180º out of the wind direction and intended direction of landing. Visual acquisition of the LZ will occur when the aircraft is approaching the abeam position.

Procedures

1. Perform a hover or no hover takeoff and transition to forward flight making the crosswind turn upon reaching 100 feet AGL.

2. Utilize a 30-45 degree AOB turn to arrive in a tight downwind (inside the normal downwind) at 200 feet AGL and 80 KIAS.

   – Maintain balanced flight throughout the pattern until intercepting the final course line

3. Initiate the maneuver from the 180º position. Start a descending, decelerating, coordinated turn to arrive at the 90° position at 150 feet and 60 KIAS.

4. From the 90° position, continue the descending, decelerating, coordinated turn to intercept final at 100 feet and 45-55 KIAS with 200-400 feet of final.

   – Use “wing down, top rudder” to maintain a straight final approach course.

5. Enter a consistent glideslope not to exceed 45º.

   – Visualize and maintain the glideslope, rate of closure and descent to the intended point of landing.

6. End the maneuver utilizing a vertical or no hover landing.

CAUTION

The radar altimeter indicates slant range. In a steep AOB it will indicate higher actual altitude. An outside scan is required and the RADALT will be used on final as back-up.

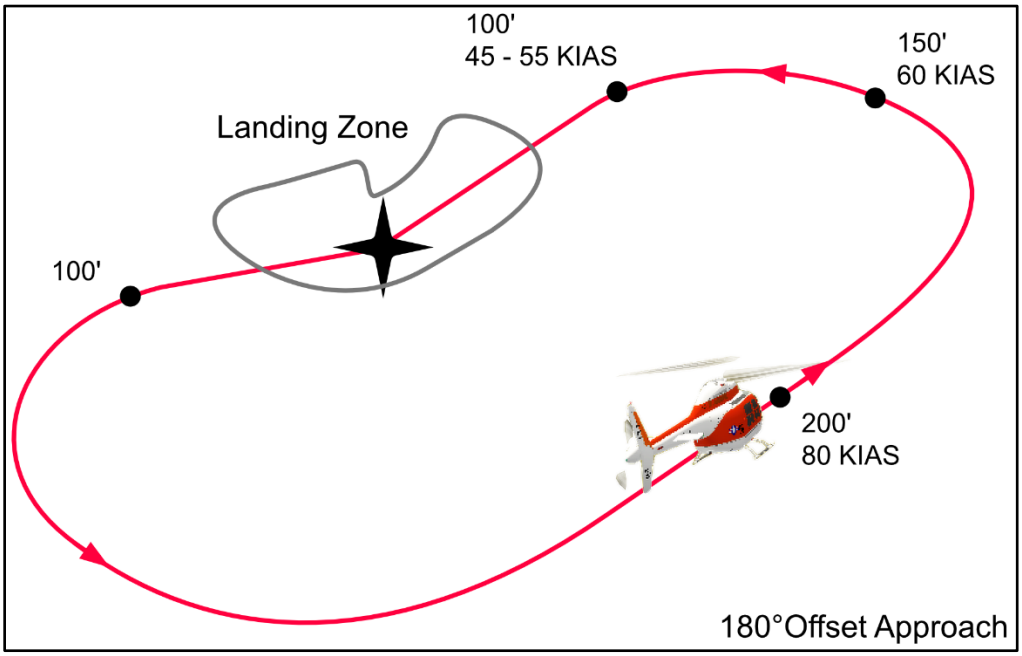

Figure 1-2 180° Offset Approach

Amplification and Technique

– AOB can be constant or vary between 30-45 degrees, realizing that a higher AOB will result in a tighter pattern, power required increases and more coordination is needed to arrive at the intended point of landing.

Common Errors and Safety Notes

1. Turning for downwind prior to reaching 100 feet.

2. Ballooning past pattern altitude or not reaching 80 KIAS.

3. Using AOB other than what is required for the approach or exceeding AOB limitations.

4. Getting too shallow or steep on final, causing excessive collective, cyclic and pedal movements, putting the aircraft in a potential overtorque situation.

5. Not acquiring and maintaining a vigilant scan to avoid all obstacles.

106. 90º OFFSET APPROACH

Maneuver Description

The 90º Offset Approach is used when ingress heading is 90º out from the wind direction and intended direction of landing. Visual acquisition will occur when aircraft is approaching the base leg for landing.

Procedures

1. Perform a hover or no hover takeoff and transition to forward flight making the crosswind turn upon reaching 100 feet AGL.

2. Fly the pattern at 200 feet AGL and 80 KIAS, turning roughly 135º away from upwind to roll out onto an oblique, 45º downwind away from the LZ.

   – Setup to ensure a wide enough downwind. If the downwind is not wide enough, the aircraft will be too tight to hit final. Setup for a base leg that allows a descent and deceleration to arrive at a 90º position at 150 feet AGL and 60 KIAS.

3. From the abeam position, begin a turn to arrive on an extended base leg at 200 feet AGL and 80 KIAS.

   – If positioning is too tight, a wave off must be performed.

4. Coordinate collective and cyclic to descend to 150 feet AGL and decelerate to 60 KIAS at a 90° position.

5. From the 90° position, initiate a descending, decelerating, coordinated turn to intercept a final with 100 feet and 45-55 KIAS with 200-400 feet of final.

   – Visualize and maintain glideslope and rate of closure to the intended point of landing. Glideslope should not exceed 45º.

6. End the maneuver utilizing a vertical or no hover landing.

   – Rate of closure and descent must be controlled, arriving over the intended landing point.

CAUTION

The radar altimeter indicates slant range. In a steep AOB it will indicate higher actual altitude. An outside scan is required and the RADALT will be used on final as back-up.

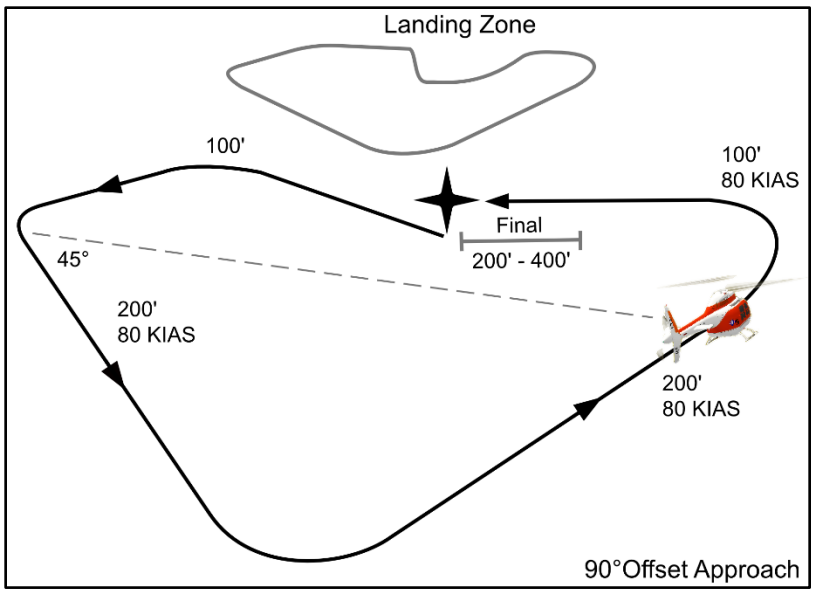

Figure 1-3 90° Offset Approach

Amplification and Technique

1. Maintain balanced flight throughout the pattern until intercepting the final course line, at which time it may be necessary to use "wing down, top rudder" to maintain a straight final approach course.

2. AOB can be constant or vary between 30-45 degrees, realizing that a higher AOB will result in a tighter pattern, power required increases and more coordination is needed to arrive at the intended point of landing.

3. The modified downwind (as shown in Figure 1-3) aids in the proper set up for a base leg, simulating an approach from a 90º position.

Common Errors and Safety Notes

1. Turning for downwind prior to reaching 100 feet.

2. Ballooning past pattern altitude or not reaching 80 KIAS.

3. Using AOB other than what is required for the approach, or exceeding AOB limitations.

4. Getting too shallow or steep on final, causing excessive, cyclic pedal movements, putting the aircraft in a potential over torque situation.

5. Not using an angled downwind, which may not allow for proper set up for a 90º turn in for the approach.

6. Not acquiring and maintaining a vigilant scan to avoid all obstacles.

107. OPERATIONS WITH AN AIRCREWMAN

Flights in almost all fleet aircraft are flown with an additional crewmember in addition to the pilot and copilot. In advanced helicopter training, you will have the opportunity to fly with an aircrewman. These highly skilled individuals contribute to the successful completion of the mission by completing unique mission specific tasks. They assist in landing zone reconnaissance and observe for clearance of obstacles during flight, hovering, and landing. During pinnacle, confined area landing (CAL), and external load operations, the aircrewman is a critical member of the crew that observes and relays vital information to the pilots.

108. CONFINED AREA LANDING

Maneuver Description. The confined area approach is a steep, power-controlled approach used when obstacles preventing a normal approach glideslope surround the intended point of landing. Smoothly controlling descent and closure rates to affect a precision descent will be used in the confined area approach and landing.

Application. CAL procedures are used when the optimum landing site is surrounded by higher terrain and/or natural and manmade obstacles.

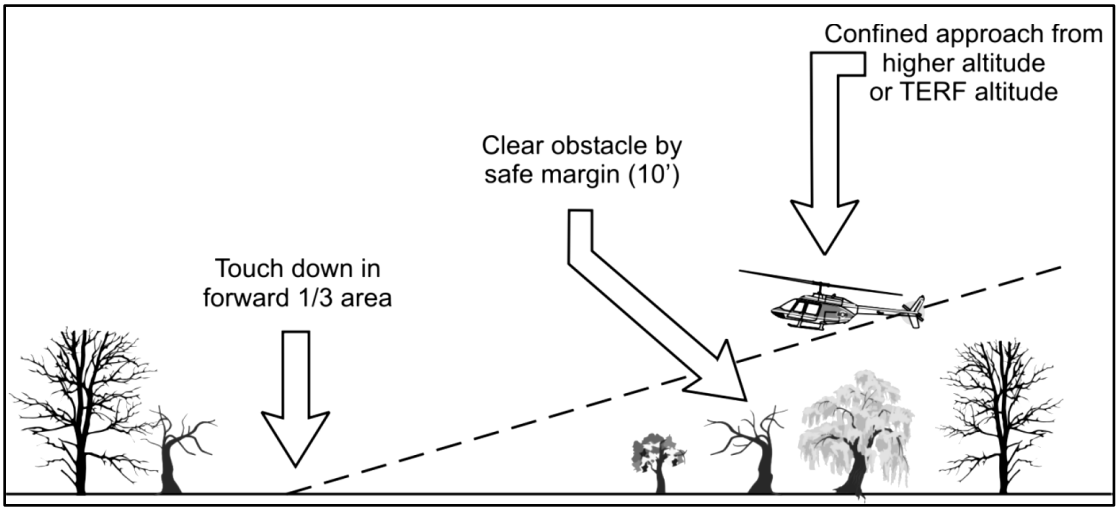

Figure 1-4 Confined Area Approach

Procedures

1. Ensure power checks are completed and power margin is satisfied.

2. Takeoff and establish a pattern at 300 to 500 feet AGL and 70 KIAS.

3. Make a reconnaissance pass of the CAL.

   a. Descend to no lower than 200 feet AGL and go no slower than 50 KIAS on the reconnaissance pass.

b. Aircrewman will describe the LZ over the ICS using the SWEEP acronym.

4. Abeam the intended point of landing at 300 to 500 feet AGL and 70 KIAS, commence a descending, decelerating turn to arrive at the 90º position with 300 feet AGL and 60 KIAS.

– Aircrewman announces *"Abeam."*

5. Anticipate and level-off at 300 feet AGL. Intercept courseline with 800-1000 feet of straightaway at 300 feet AGL. Decelerate to 45 KIAS.

a. Announce "*On final left/right seat for CAL zone __*." when established on final.

b. Aircrewman acknowledges with *"Roger, on final left/right seat for CAL zone __*."

c. Aircrewman begins advisory ICS calls.

6. Approaching glideslope (25-45 degrees), reduce power to begin the descent.

a. Visualize the glideslope and closure rate to the intended point of landing.

b. Adjust power as necessary to maintain the glideslope.

c. Intended point to landing will be in the upwind one third of the LZ.

CAUTION

If the glideslope becomes excessive (greater than 45º) or uncomfortable, wave off.

7. Maintain glideslope that allows the tail rotor to clear obstacles by at least ten feet and the touchdown area will be in the upwind one third of the LZ.

8. As the aircraft approaches the edge of the CAL, pull in power to reduce rate of descent for tail rotor clearance, adjust closure rate as necessary, and continue forward.

a. Aircrewman calls distance and makes advisory calls.

b. Aircrewman announces *"Tail clear."* once tail rotor clearance is observed.

9. Once the aircrewman gives the *"Tail clear."* call, decrease collective to continue descent into the CAL. Maintain comfortable closure rate.

a. Aircrewman continually clears around aircraft once in the CAL.

b. Aircrewman gives commands over ICS.

c. Any crewmember announces *"Committed."* when waveoff is no longer possible.

10. Continue forward and down until established in a steady 5' hover in the upwind 1/3 of the CAL.

a. Aircrewman announces *"Clear right and below."*

b. PNAC announces *"Clear left."*

c. Aircrewman clears under aircraft and announces, *"Clear to land."*

11. Smoothly execute a vertical landing, anticipate sloping or rough terrain in the LZ.

a. Landing in the CAL is at IP discretion.

b. The first approach into the CAL should be to a hover.

CAUTION

Terrain in the LZ may be sloping or rough, and condition may make visual assessment of the surface difficult. Landing in the CAL is at IP discretion. The first approach into the CAL should be to a hover.

Crew Resource Management

1. Crew completed power checks prior to CAL operations. (Mission Analysis)

2. Aircrewman describes confined area LZ to other crewmembers. (Situational Analysis)

3. Crew uses tactical voice procedures throughout approach and landing. (Communication)

Amplification and Technique

1. Landing site evaluation is crucial to safe flight conduct. Perform a reconnaissance pass of the LZ using the acronym SWEEP: S-Size, Slope, Surface, Suitability; W-Winds, Possible loss of Wind Effect; E-Elevation (AGL, PA, DA); E-Egress Route (including waveoff direction); P-Power (required vs. available).

2. Planning the approach requires consideration of several factors. First, choose the approach direction which allows for taking advantage of wind effects, provides the lowest obstacle and best entry into the zone. Second, plan the flight path to place the helicopter within autorotational distance of areas most favorable for a forced landing. Third, when it is not possible to keep the LZ in sight, specific reference points along the flight path can be selected to keep the pilot oriented while maneuvering.

3. Power checks shall to be completed prior to performing CAL operations.

4. Smooth, coordinated cyclic and collective inputs are required to maintain the glideslope without requiring excessive power.

5. ***Refer to TH-57 NATOPS flight manual figure 9-2 for tactical voice procedures.***

Common Errors and Safety Notes

1. Ensure power required to takeoff does not exceed required margin from power available.

2. Rate of closure is critical. As the rate of closure increases, rate of descent also increases. Avoid descent rates in excess of 800 feet per minute (FPM) when airspeed is below 40 KIAS; vortex ring state may result.

3. Whenever the glideslope exceeds 45º or the approach becomes uncomfortable, wave off.

4. As the helicopter crosses the obstacle, ensure the aircrewman has cleared the tail rotor. If not cleared, do not descend into the CAL.

5. Anticipate a loss of wind effect or turbulence as the helicopter nears and descends below the upwind obstructions.

6. Failure to reduce collective a sufficient amount when intercepting the glideslope will cause ballooning or steepening of the glide angle.

7. While in the confined area LZ, any aircraft movement shall be cleared by all crewmembers prior to commencement. The aircraft may be turned a maximum of 90º at a time.

109. CONFINED AREA TAKEOFF

Maneuver Description. The confined area takeoff is a precision maneuver designed to provide proper obstacle clearance and minimal exposure to the Caution/Avoid areas of the Height-Velocity Diagram.

Application. CAL procedures are used when the optimum landing site is surrounded by higher terrain and/or natural and manmade obstacles.

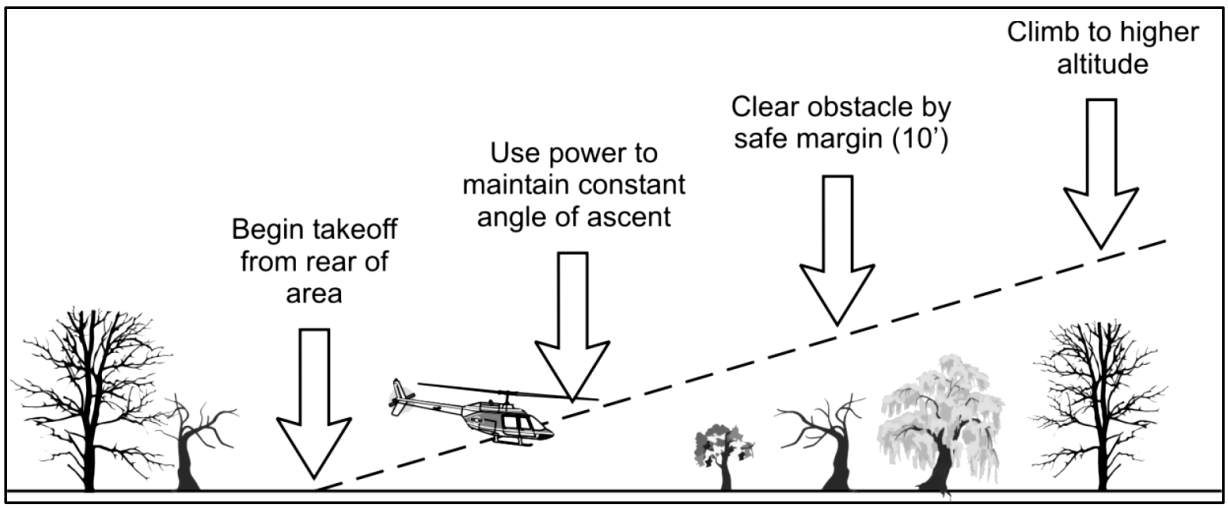

Figure 1-5 Confined Area Takeoff

Procedures

1. Check gauges and caution lights and establish a steady 5-foot hover.

   – PAC announces *"Steady."*

2. Complete two 90 degree left turns to face the downwind one third of the CAL.

   a. Aircrewman clears tail for each turn and announces, *"Tail clear for first/second ninety."*

   b. PNAC clears nose and left side of aircraft and announces, *"Clear left."*

   c. Execute left 90 degree pedal turn after clearance calls are received.

   d. Stabilize in a steady hover after each turn. PAC announces *"Steady."*

3. Once in a steady 5-foot hover facing the downwind one third of the CAL, begin a slow taxi forward.

   a. PNAC announces *"Clear left and forward."*

   b. Aircrewman announces *"Clear right and forward for taxi."*

4. Hover taxi to the downwind one third of the CAL and resume a stable hover.

   a. Aircrewman continually clears around aircraft and gives commands.

   b. PAC announces *"Steady."*

5. Complete two additional 90 degree left turns to line up on departure heading.

– Repeat procedures from step 2.

6. Receive takeoff clearance from aircrewman and make radio call, *"(OLF) traffic, (Aircraft call sign), lifting CAL Zone ____."*

7. From a hover, check the gauges and caution lights, and smoothly increase power to establish a sufficient rate of climb and angle of ascent to clear the highest obstacle by ten feet (tip path plane above highest obstacle).

– Monitor torque throughout vertical climb.

8. When forward clearance is sufficient, begin a smooth acceleration and transition to forward flight. Keep the scan moving and continually clear all parts of the helicopter.

9. When clear of all immediate obstacles, maneuver as necessary while gaining airspeed as soon as possible.

Crew Resource Management

1. Crew completes power checks prior to CAL operations. (Mission Analysis)

2. Aircrewman gives commands (Situational analysis)

3. Crew uses tactical voice procedures throughout approach and landing. (Communication)

Amplification and Technique

1. Power checks shall be completed prior to performing CAL operations.

2. Select the best takeoff route optimizing wind and the lowest obstacle clearance. Remember, include a minimum of ten feet of clearance from the highest obstacle on the intended flight path. If possible, the takeoff should be initiated from the downwind one third of the LZ. This will provide the most shallow departure glideslope.

3. ***Refer to TH-57 NATOPS flight manual figure 9-2 for tactical voice procedures.***

Common Errors and Safety Notes

1. Do not practice CALs without another aircraft available as a safety observer. Repositioning the crash crew to the confined area of the field is required if no aircraft is available.

2. Always ensure tail rotor clearance prior to maneuvering in the zone. A tail rotor strike may occur, resulting in complete loss of tail rotor thrust.

3. Rushing the maneuver may cause settling, poor yaw control, and loss of obstacle clearance. Confined area takeoffs are precision maneuvers and require more time and concentration than normal takeoffs.

4. Smooth control coordination is required throughout the takeoff. Use power judiciously.

5. Because the helicopter is below the obstacles, the wind may not provide extra lift until clear of the obstacles.

6. While in the confined area LZ, any aircraft movement shall be cleared by all crewmembers prior to commencement. The aircraft may be turned a maximum of 90º at a time.

110. QUICK STOP

Maneuver Description. Quick stop is a coordinated deceleration of the helicopter while maintaining constant heading and altitude.

Application. The quick stop enables the pilot to develop the control coordination required to decelerate the helicopter as quickly as possible while keeping the helicopter in a safe flight envelope. This is a “build up” maneuver to the high-speed approach.

Procedures

1. Maintain 500 feet AGL and accelerate to 100 KIAS on the downwind.

2. At the 180º position, begin a descending turn towards the courseline.

   a. The 180º position is approximately abeam the downwind field boundary.

   b. Maintain balanced flight.

3. Arrive at the 90º position at 300 feet AGL and 100 KIAS.

4. Continue the turn and descent, maintaining safe obstacle clearance, to arrive on the courseline at 50 feet AGL and 100 KIAS.

   – Establish crosswind corrections as necessary.

5. Stabilize momentarily at 50 feet AGL, 100 KIAS, then coordinate down collective and aft cyclic to slow the aircraft while maintaining constant heading and altitude.

   a. Once stabilized, smoothly coordinate down collective with aft cyclic and right pedal.

   b. Slow down as rapidly as possible while maintaining constant heading and altitude.

   c. Simultaneous coordination of flight controls is required.

6. Slow to 45 KIAS.

7. Commence the recovery by coordinating forward cyclic, up collective and left pedal in sufficient time to recover the aircraft at 50 feet AGL and 45 KIAS.

– Initiating up collective at approximately 48 KIAS will typically prevent slowing below 45KIAS**.**

8. Check engine instruments and accelerate to 70 KIAS and resume a normal climb.

Crew Resource Management

PNAC calls out airspeeds and altitudes. (Communication)

Amplification and Technique

– The more the collective is lowered in coordination with aft cyclic inputs, the faster the aircraft will decelerate. If collective is not lowered enough the aircraft may not slow to 45 KIAS prior to the upwind field boundary.

Common Errors and Safety Notes

1. Failure to sufficiently lower the collective or applying an abrupt aft cyclic movement will cause the helicopter to balloon. Maintain constant altitude and ground track.

2. Avoid the common tendency to let the airspeed get excessively slow during the recovery.

3. Avoid the common tendency to descend or balloon on entry due to poor cyclic and collective control coordination.

4. The quick stop shall be initiated by the middle of the field.

5. Safe obstacle clearance shall be maintained throughout the entire maneuver.

111. HIGH-SPEED APPROACH

Maneuver Description. The high-speed approach enables the pilot to make a safe transition from high speed low-level flight to a steep approach terminating in a hover or no-hover landing.

Application. A high-speed approach is used to enter and land in an area where tactical considerations require a quick ingress and low altitude flight for terrain masking.

Procedures

1. Maintain 500 feet AGL and accelerate to 100 KIAS on the downwind.

2. At the 180º position, begin a descending turn towards the courseline.

   a. The 180º position is approximately the downwind boundary.

   b. Maintain balanced flight.

3. Arrive at the 90º position with 300 feet AGL and 100 KIAS.

4. Continue the turn and descent, maintaining safe obstacle clearance, to arrive on the courseline at 50 feet AGL and 100 KIAS.

   – Establish crosswind corrections as necessary.

5. Stabilize momentarily at 50 feet AGL, 100 KIAS, then coordinate down collective and aft cyclic to slow the aircraft while maintaining constant heading and altitude.

   a. Once stabilized, smoothly coordinate down collective with aft cyclic and right pedal.

   b. Slow down as rapidly as possible while maintaining constant heading and altitude.

   c. Simultaneous coordination of flight controls is required.

6. Slow to 45 KIAS.

7. Begin the descent when a 25-45 degree glideslope IAW contact FTI steep approach can be maintained.

   – Initiating up collective at approximately 48 KIAS will typically facilitate glideslope intercept.

8. Terminate the approach in a hover or no-hover landing.

Crew Resource Management

PNAC calls out airspeeds and altitudes. (Communication)

Amplification and Technique

1. Coordinate cyclic and collective to continue the deceleration to arrive at a steep approach glideslope with 50 feet AGL and 15 to 20 KTS groundspeed.

2. Adjust the rate of descent and rate of closure to arrive over the intended point of landing at zero groundspeed and hover altitude.

3. Cyclic, collective, and directional control pedals must be coordinated to slow the helicopter while maintaining a constant heading and altitude. The pilot must anticipate the distance

required to decelerate the aircraft and establish the helicopter on a steep approach glideslope to the intended point of landing.

4. This approach may be terminated in a hover or no-hover landing; however, don't surprise your instructor. Communicate so both pilots are fully aware of your intention.

Common Errors and Safety Notes

1. See the "Common Errors and Safety Notes" under "QUICK STOP" (Section 111).

2. Failure to maintain 100 KIAS until beginning the deceleration.

3. Descending below 50 feet AGL on final.

4. Failure to momentarily stabilize at 100 KIAS and 50 feet AGL.

5. Allowing the aircraft to balloon.

6. Failure to maintain heading and ground track.

7. Failure to establish a 25-45 degree glideslope IAW Contact FTI steep approach and maintaining a constant glideslope during the approach.

8. An excessively nose high attitude at low altitude may result in the tailskid contacting the ground, which may cause serious structural damage to the aircraft.

9. The nose attitude of the aircraft, once established on the steep approach glideslope, may be well above a normal steep approach due to the rapid deceleration required to perform this maneuver correctly. Anticipate arrival on the glideslope with a higher nose attitude than normal. Maintain 50 feet AGL until established on the glideslope.

112. PINNACLE APPROACH/LANDING/TAKEOFF

Maneuver Description. The pinnacle approach and landing is a precision, power-controlled approach used when the intended point of landing is elevated above the surrounding terrain.

Application. Pinnacle operations are used when landing on an elevated LZ, which may be a ship's flight deck or a LZ in mountainous terrain.

Procedures

1. Ensure power checks are completed and power margin is satisfied.

2. Takeoff and establish a pattern at 300 to 500 feet AGL and 70 KIAS.

3. Make a reconnaissance pass of the pinnacle.

   a. Descend to no lower than 200 feet AGL and go no slower than 50 KIAS on the reconnaissance pass.

   b. Aircrewman will describe the LZ over the ICS using the SWEEP acronym.

4. When abeam the intended point of landing at 300 to 500 feet AGL and 70 KIAS, commence a descending, decelerating turn to arrive at the 90º position with 300 feet AGL and 60 KIAS.

   a. Aircrewman announces *"Abeam."*

   b. Anticipate a level-off at 300 feet AGL and continue to decelerate to arrive on the courseline with 800 to 1000 feet of straightaway at 300 feet AGL.

5. Continue to decelerate to 45 KIAS while approaching the glideslope. For the normal approach, intercept the course line between 150 to 200 feet AGL, 50 KIAS, and 600 to 800 feet of straightaway.

   a. Announce, *"On final left/right seat for the pinnacle."* when established on final.

   b. Aircrewman acknowledges with *"Roger, on final left/right seat for the pinnacle."*

   c. Aircrewman begins advisory ICS calls.

6. Intercepting glideslope (10-20 degrees for normal, 25-45 degrees for steep), reduce power to begin the descent. Visualize the glideslope and closure rate to the intended point of landing. Adjust power as necessary to maintain the glideslope.

   – Intended point to landing will be near the upwind boundary of the LZ.

CAUTION

If the glideslope becomes excessive (greater than 45º) or uncomfortable, wave off.

7. Continue forward and down until established in a steady 5' hover or continue to a no hover landing.

   a. Aircrewman announces *"Clear right and below."*

   b. PNAC announces *"Clear left."*

   c. Aircrewman clears under aircraft and announces, *"Clear to land."*

8. Smoothly execute a vertical or no hover landing, anticipate sloping or rough terrain in the LZ.

a. IPs may execute vertical or no hover landing on first approach.

b. No hover landings shall not be executed by a SMA or IUT until one vertical landing has been accomplished.

9. Check gauges and caution lights and establish a steady 5-foot hover. Complete a clearing turn.

10. Receive takeoff clearance from aircrewman and smoothly increase power to establish a sufficient rate of climb and angle of ascent to clear the highest obstacle by ten feet (tip path plane above highest obstacle).

– Monitor torque throughout vertical climb.

11. When forward clearance is sufficient, begin a smooth acceleration and transition to forward flight. Keep the scan moving and continually clear all parts of the helicopter.

a. Select the best takeoff route optimizing wind effects and lowest obstacle clearance.

b. Include a minimum clearance of ten feet from the highest obstacle on the intended flight path.

12. When clear of all immediate obstacles, maneuver as necessary while gaining airspeed as soon as possible.

Crew Resource Management

1. Crew completes power checks prior to pinnacle operations. (Mission Analysis)

2. Aircrewman gives commands (Situational Awareness)

3. Crew uses tactical voice procedures throughout approach and landing. (Communication)

Amplification and Technique

1. Power checks needs to be completed prior to performing pinnacle operations. Landing site evaluation is crucial to safe flight conduct. Perform a reconnaissance pass of the LZ to ensure the area is clear and check the best arrival and departure routes using the acronym SWEEP: S-Size, Slope, Surface, Suitability; W-Winds, Possible loss of Wind Effect; E-Elevation (AGL, PA, DA); E-Egress Route (including waveoff direction); P-Power (required vs. available).

2. Planning the approach requires consideration of several factors. First, choose the approach direction which allows for taking advantage of wind effects, provides the lowest obstruction and best entry into the zone. Second, plan the flight path to place the helicopter within authoritative distance of areas most favorable for a forced landing. Third, when it is not possible to keep the LZ in sight, specific reference points along the flight path should be selected to keep the pilot oriented while maneuvering.

3. The techniques of utilizing power and cyclic coordination to affect a normal or precision descent shall be used in the pinnacle approach and landing. The pinnacle takeoff is a precision maneuver designed to provide obstacle clearance and minimize flight in the Caution/Avoid areas of the Height-Velocity diagram when transitioning to takeoff from an elevated LZ.

4. ***Refer to TH-57 NATOPS flight manual figure 9-2 for tactical voice procedures.***

Common Errors and Safety Notes

1. Rate of closure is critical. As the rate of closure increases, the rate of descent also increases. Avoid descent rates in excess of 800 FPM when airspeed is below 40 KIAS; vortex ring state may result.

2. Whenever the glideslope exceeds 45º or the approach becomes uncomfortable, wave off.

3. Failure to sufficiently reduce the collective when intercepting the glideslope will cause ballooning or steepening of the glideslope angle.

4. Ensure the aircrewman clears the landing area prior to landing. Failure to wait for the aircrewman's ***"Clear to land"*** may result in dynamic rollover caused by excessive lateral drift or improper placement on the pinnacle.

5. Smooth control coordination is required throughout the takeoff. Rushing the maneuver may cause settling and poor yaw control resulting in loss of obstacle clearance.

CHAPTER TWO
EXTERNAL LOAD OPERATIONS

200. INTRODUCTION

This chapter introduces the student to the basic fundamentals of external load operations. The procedures contained herein are intended to provide a foundation for external load operations, which will meet most mission requirements.

201. EXTERNAL LOAD OPERATIONS

The two basic modes of helicopter cargo transport are internal and external loading. Only external loads will be discussed in this section. The Type, Model, Series specific NATOPS manual should be consulted prior to attempting such a mission.

Preflight briefings, weight and balance computations, and cargo hook system~~s~~ preflight are essential steps to complete prior to commencing external load operations. The aircraft discrepancy logbook should be closely screened for any trends regarding a malfunctioning cargo release system. Do not attempt this operation with an uncorrected discrepancy on the cargo release system.

The TH-57 has a detachable external cargo hook which is located at the center of gravity when installed. It is capable of lifting a 1500-pound load and has an electrical release on the cyclic and a manual release located between the pilots. The electrical release is the preferred method of releasing the load; however, do not hesitate to use the manual release if problems arise. There is also a manual release on the hook itself. Check all release mechanisms for proper operations prior to flight.

For external operations in the TH-57, an aircrewman is required in the helicopter and an additional aircrewman is required to act as a “hook up man”, attaching the load to the cargo hook. The aircrewman in the cabin area shall give verbal directions to the pilot concerning pickup, drop, and status of the load during flight. The aircrewman will conduct an external load brief. An example of the aircrewman's brief prior to flight is as follows:

202. EXTERNAL LOAD PICK-UP AND DROP-OFF

Maneuver Description. This maneuver enables the crew to safely conduct the movement of external cargo from a Pickup Zone (PZ) to a designated Drop Zone (LZ).

Application. External operations facilitate the rapid transfer of cargo between two points both at sea and ashore.

Procedures

1. Ensure power checks are completed and power margin is satisfied.

2. Complete a transition to forward flight arriving at 300 feet AGL and 70 KIAS on down wind.

   a. Upon completing the Power Check at 50 feet AGL apply slight forward cyclic pressure to achieve translational lift.

   b. Utilize collective as required to prevent settling.

3. Abeam of the intended point of landing, begin the approach to arrive at the 90° position with 150 to 200 feet AGL and 60 KIAS.

   – Aircrew will call the abeam position.

4. Continue the decelerating descent to intercept final at 125 feet AGL, 45 KIAS, and 400 to 600 feet of straightaway into the wind.

   a. Pilot reports *"On final, right/left seat, pick."*

   b. Aircrew responds *"Roger, right/left seat, pick."*

   c. Aircrew begins giving verbal commands at approximately 100 feet from the load, and easy commands within approximately 30 feet from the load.

NOTE

Waveoff and hold are mandatory voice and hand signals.

5. Terminate the approach to a 10-foot AGL hover over the external load.

   – Any required positioning over the load will be done using easy commands indicating direction and distance.

6. Maintain a steady 10-foot AGL hover as external load is attached by the hook up man.

   – The hook up man will come under the helicopter from the right side and attach the load. Any hover adjustments will be directed by the aircrewman, the following aircrew calls can be expected:

     i. *"Steady, over the load."*

     ii. *"Hookup man coming in."*

     iii. *"Load hooked up."*

2-2 EXTERNAL LOAD OPERATIONS

7. After the hookup man has attached the external load and when cleared to do so by aircrew, smoothly apply collective and climb vertically to arrive in 25-foot hover.

a. The pilot must lift vertically over the load until slack is taken up from the pendant.

b. The aircrewman will notify the pilot tension is coming on (approximately 15 feet). This may not be felt if the pilot is smooth.

c. Any hover adjustments will be directed by the aircrewman, the following calls can be expected:

– *"Hookup man is clear."*

1). *"Easy up."*

2). *"Weight coming on."*

3). *"Load is clear."*

d. As power is being applied to lift the load off the deck the Pilot Not At The Controls should be providing torque call outs verifying power remains within acceptable limits. *"Torque checks ___%."*

– *"Clear for forward flight on the right."*

NOTE

Clearance for forward flight is not given until cleared by aircrewmen.

8. When cleared by aircrew smoothly transition to forward flight to enter a 300 foot 70 KIAS downwind.

a. Transition to forward flight and initial climb must be smooth and commensurate with the aircraft operating limitations. Sufficient power, not to exceed maximum allowable torque, must be applied on the initial takeoff transition to ensure that the load clears all obstacles by a safe altitude (usually 50 to 100 feet above the tallest immediate obstruction). Do not rush the transition as settling of the helicopter may result.

NOTE

Settling may cause the load to drag on the ground.

b. The aircrewman will advise the pilot regarding the load position and status. An unstable load may jump, oscillate, or rotate which can result in a loss of control and impose undue stresses on the helicopter.

NOTE

Jettisoning of the load may be necessary if oscillations are endangering the helicopter.

NOTE

Flying over personnel, buildings and other aircraft is prohibited when carrying external loads. Remain within field boundaries at all times when carrying external load.

9. Abeam of the intended point of landing, begin the approach to arrive at the 90° position with 150 to 200 feet AGL and 60 KIAS.

– Aircrew will call the abeam position.

10. Continue the decelerating descent to intercept the approach final at 125 feet AGL, 45 KIAS, and 400 to 600 feet of straightaway into the wind.

a. Pilot reports *"On final, right/left seat, drop."*

b. Aircrew responds *"Roger, right/left seat, drop."*

c. Aircrew starts giving verbal commands at approximately 100 feet from the load, and easy commands within approximately 30 feet from the load.

d. The pilot must ensure that closure rate and rate of descent are under control before continuing the approach. Only a limited amount of power will be available at the bottom of the approach to hover the aircraft.

NOTE

Waveoff and hold are mandatory voice and hand signals.

11. Terminate the approach in a 25-foot AGL (Tension altitude plus 10 feet) hover over the intended DZ.

a. Any required positioning over the DZ will be done using easy commands indicating direction and distance.

b. If drifting off the spot, stop the aircraft drift. Do not attempt to make corrections until advised by aircrewman.

2-4 EXTERNAL LOAD OPERATIONS

12. At the crewman's command, begin a vertical descent until the load is on the deck. The aircrewman will give advisory calls throughout the descent and signal the pilot to release the load.

– When the helicopter is in position for the drop the following calls can be expected:

i. *"Easy down."*

ii. *"Load on deck."*

iii. *"Easy down two feet."*

iv. *"Steady."*

v. *"Clear to release load."*

vi. *"Hook clear."*

vii. *"Clear for forward flight on the right."*

Crew Resource Management

1. PAC reports *"On final for the drop/pick."* to other crewmembers. (Communication)

2. Aircrewman performs verbal dialogue 100 feet from the load. (Communication)

3. Aircrewman signals ground personnel once established in a hover over the load *"Ready for hookup."* (Communication)

4. Pilot Not At The Controls provides torque advisory calls. (Communication)

Common Errors and Safety Notes

1. Lift the load gently off the ground. Do not snatch the load off the ground.

2. Because aircraft gross weight is increased by the load, anticipate and watch power required to lift the load. Remember, high power settings require more left rudder to hold the aircraft steady. An out-of-the-windline pickup may result in an overtorque.

3. Should a partial or complete power loss occur in flight, jettison the load before making a forced landing.

4. Should a partial or complete power loss occur in a hover with the load attached, jettison the load immediately and execute a taxiing autorotation to the left and forward. The ground personnel will be moving rapidly to the right to clear.

5. Excessive rates of descent at high gross weights can lead to power required exceeding power available.

6. High power settings in a hover out of the windline may result in loss of tail rotor effectiveness.

7. Because of electrical shock hazard, especially for large helicopters operating in rainy conditions, ground hook-up crews should touch the grounding wire or load to the hook and not grab the helo hook with their hands.

2-6 EXTERNAL LOAD OPERATIONS

APPENDIX A
AIRCREWMAN BRIEF

Aircrewman Brief

The aircrewman is responsible to the pilot for preflight briefings and procedures specific to pinnacle, CAL, and external load operations. The aircrewman will brief with the pilots and cover mission specific items during pre-flight mission planning and the NATOPS brief. The TH-57 aircrewman's brief for pinnacle, CAL, and external load operations is included below:

1. **Aircraft Configuration**

    a. Operations with doors removed

    b. Aircrewman seating, use of seatbelt

    c. Cargo hook preflight (External load)

2. **General**

    a. OLF description, patterns to be used, OLF boundaries

    b. Height of obstacles

    c. Landing zone description, reconnaissance pass

    d. Entry route, possible loss of wind effect

    e. Power available vs. power required

    f. Departure route

    g. Pendant length/weight (External load)

3. **Use of Standard ICS Calls**

    a. Pinnacle/CAL/external load operations specific

    b. Descent clearance every five seconds

    c. Tail rotor clearance

    d. Pilot advises crew of intentions

4. **Clearance Requirements**

   a. Aircrewman clears right, tail, and below

   b. PNAC clears left

   c. Obstacle clearance (minimum ten feet)

   d. 90º maximum turns (CAL)

   e. Landing clearance

   f. Takeoff clearance

   g. Transition to forward flight clearance

5. **ICS Failure**

   a. Alert pilots (Pre-coordinated signal)

   b. Execute drop using push/pull method on pilot's shoulder (External load)

   c. Waveoff or land (Pinnacle/CAL)

      i. If not committed to LZ – waveoff.

      ii. If committed to LZ – land using push/pull method on pilot's shoulder.

   d. Troubleshoot on deck.

   e. Reposition for departure using Landing Signalman Enlisted (LSE) signals.

   f. Departure clearance.

6. **Cargo Hook Failure (External load)**

   a. Advise pilots ***"Hold, no release."***

   b. Tension, circuit breaker, electrical release, emergency T handle

   c. In the event of total hook failure:

      i. Advise pilot for landing; ensure skids straddle pendant.

      ii. Manually release pendant.

7. **Engine Failure (External load)**

   a. Engine failure during pickup:

      i. Release load.

      ii. Aircraft, forward and left.

      iii. Hook-up man, right.

      iv. Execute emergency landing.

   b. Engine failure during transition:

      i. Release load.

      ii. Execute emergency landing.

8. **Inadvertent Seatbelt Release**

   a. Notify pilots.

   b. PAC fly straight and level.

   c. Aircrewman reports *"Set aft."* when seatbelt secured.

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