

**ARNG WARRIOR TRAINING CENTER
PATHFINDER COURSE
FORT BENNING, GEORGIA 31905**

071A0204

05 February 2014

HLZ SUMMARY SHEET:

INSTRUCTIONAL INTENT: To enable the Pathfinder student to plan for and operate day or night air assault operations. The student will learn how to plan, organize and operate a HLZ; coordinate with ground unit commanders and the duties and responsibilities of the different elements involved in the operation of an HLZ.

I. Helicopter Landing Zone Operations:

Helicopter Landing Zone: Area that contains one or more landing sites

Helicopter Landing Site: Specific Area that contains one or more Landing Points and has a control center

Helicopter Landing Point: Specific point on the ground designated for one specific aircraft

II. HLZ Selection

A. 2 Considerations:

1. **Tactical:** Ground Unit Commander; Aviation Unit Commander

- a. Estimate of situation based on METT-TC
- b. Location of Objective in relation to the tentative HLZ
- c. Size and type of unit supported

2. **Technical:** Pathfinder

Uses Maps, Aerial Photographs, Ground or Air Recon

7 Selection Factors:

1. Number and Type of Aircraft
2. Landing Formation
3. Surface Conditions
4. Obstacles
5. Approach and Departure Routes
6. Atmospheric Conditions
7. Loads

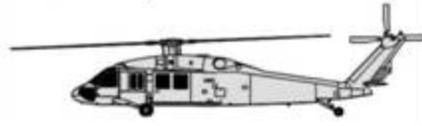
Number and Type of Aircraft: Determines the size requirement for the HLS

1. Size of TDP is determined by

- a. Pilot and Unit Proficiency
- b. Size and Type of Aircraft
- c. Atmospheric Conditions
- d. Visibility (Day/Night)
- e. Type of Mission (Insertion, Extraction, Slingload, etc)

2. TDP Sizes:

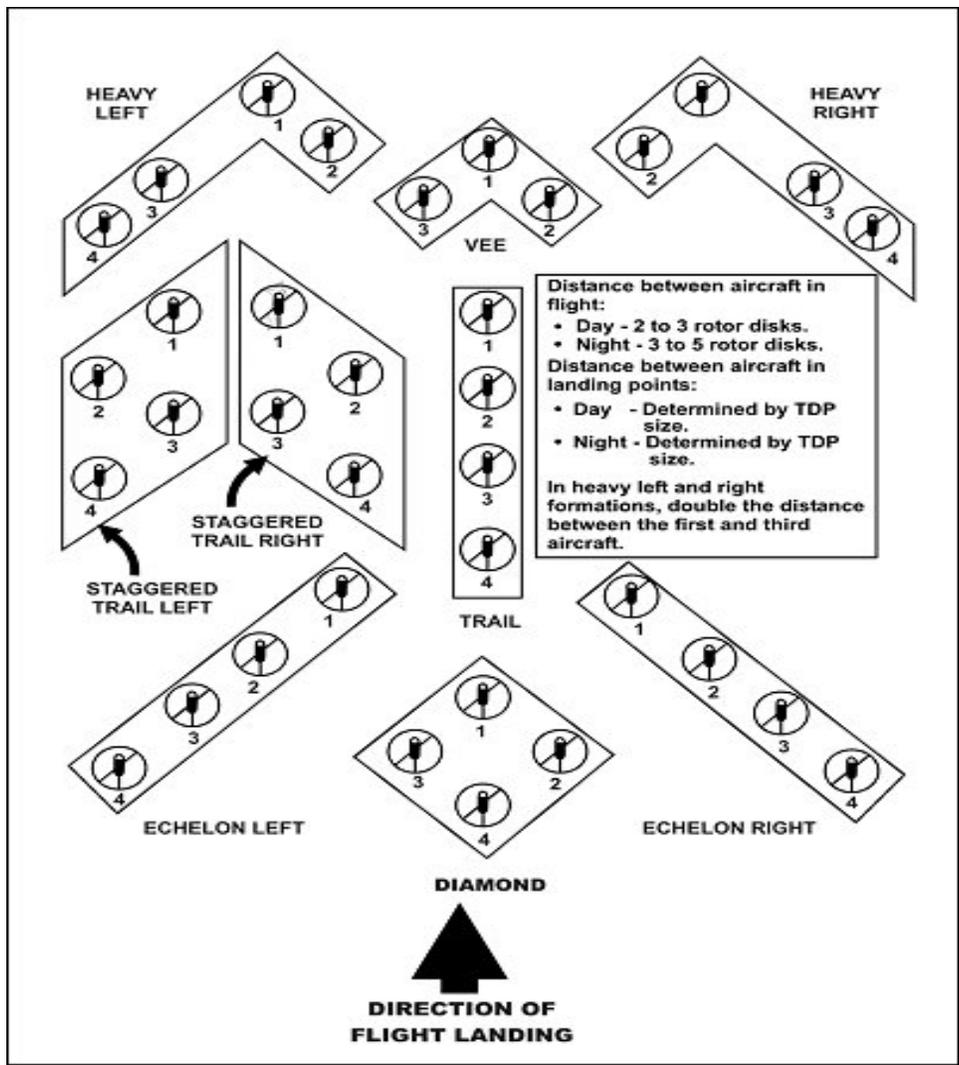
1. 25 meters: Light observation helicopters (OH-58, MH-6)
2. 35 meters: Light utility and attack helicopters (UH-1, AH-1, UH-72)
3. 50 meters: Medium utility helicopters (UH-60, AH-64)
4. 80 meters: Cargo helicopters (CH-46, CH-47, CH-53, V-22)
5. 100 meters: Slingload and unknown helicopters
6. 125 meters: Slingload using long-lines
7. 150 meters: Slingload operations at night using night vision

LANDING POINT	MINIMUM DIAMETER OF LANDING POINT	HARD SURFACE	SURFACE CLEARED	OBSTRUCTION FREE
SIZE 1 - Light Observation OH-58D OH-6 	25M	5M	15M	25M
SIZE 2 - Light Utility and Attack UH-1H H-65 AH-1W 	35M	10M	20M	35M
SIZE 3 - Medium Utility and Attack UH-60 H-2 AH-64 	50M	15M	35M	50M
SIZE 4 - Cargo CH-47 CH-53 	80M	15M	35M	80M

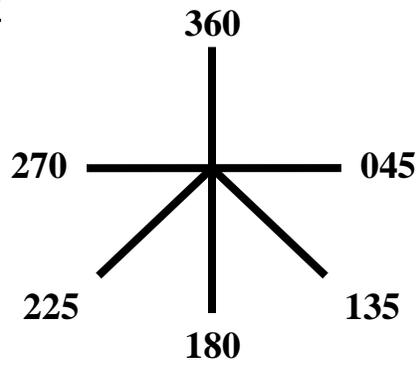
3. Aviation Commander may authorize the Pathfinder to reduce TDP size by one size

C. Landing Formations: (9 Flying and Landing formations) The Pathfinder must attempt to match the landing formation with the flight formation.

1. Trail
2. Echelon Left
3. Echelon Right
4. Staggered Trail Left
5. Staggered Trail Right
6. Heavy Left
7. Heavy Right
8. V
9. Diamond ***MOST SECURE**



CROWS FOOT



D. Surface Conditions:

1. Must be firm enough to support the Aircraft
2. TDP's must be free of sand, snow, or loose debris that might cause problems for aircraft due to rotor wash.
3. TDP's must also be cleared of obstacles.
4. If surface conditions are not conducive to the aircraft, the aircraft must be advised to "Terminate at a hover."

E. Obstacles: An obstacle is anything within the HLS that is **18 inches high, wide, or deep.**

Use the **4 R's** when dealing with obstacles

- A. **Remove** the obstacle
 - B. **Reduce** the obstacle
 - C. Mark in **Red**
 - D. **Radio** the Pilot and notify
- * Slope can be an obstacle

Ground Slope: Aircraft landing requirements

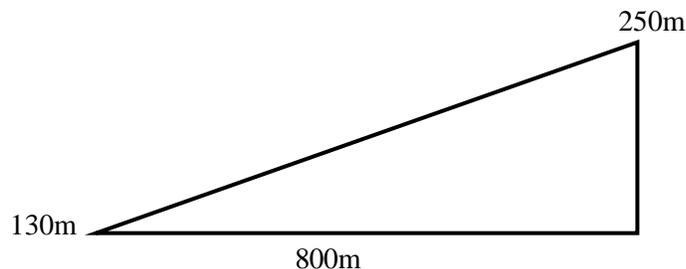
1. 0-7 Degrees All aircraft can land
2. 8-15 Degrees Medium Utility and Attack Aircraft (w/ wheels) **with advisory info**
3. Greater than 15 Degrees No Aircraft can land

DETERMINING GROUND SLOPE

Ground Slope Formula in Degrees: $\frac{V \times 57.3}{H} = \text{Degrees of slope (Round up to nearest whole)}$

V = Vertical Distance

H = Horizontal Distance



$$V = (250\text{m} - 130\text{m} = 120\text{m})$$
$$H = 800$$

$$\frac{120 \times 57.3}{800} = \frac{6876}{800} = 8.595$$

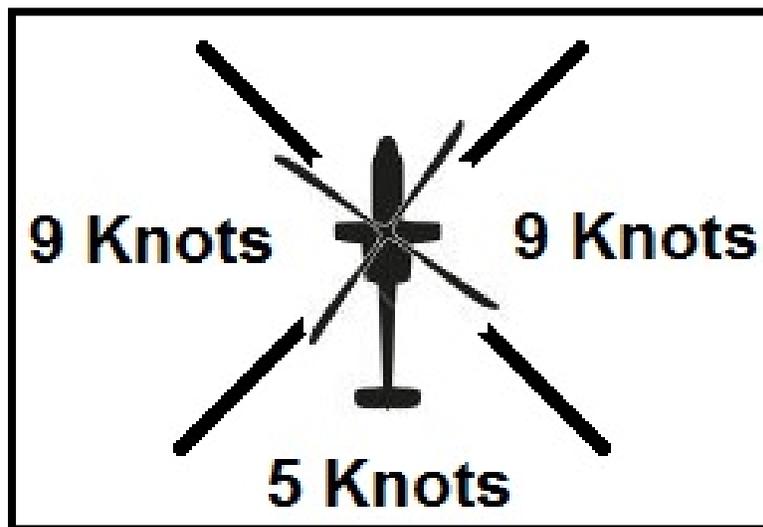
$$8.595 = 9 \text{ Degrees of slope}$$

*Convert Meters to feet by multiplying the amount of meters by 3

NEVER land an aircraft facing down-slope, if possible.

F. Approach and Departure Routes:

1. General approach and departure
 - A. Facing into the wind
 - B. Over the lowest obstacle
 - C. Using the long axis of the site
2. Departure Direction
 - A. 45 Degrees left and right of land heading
3. Prevailing Wind Limitations
 - A. Crosswind 0 – 9 knots
 - B. Tailwind 0 – 5



Approach and Departure Obstacle Ratio

1. Day Ops 10:1
2. Night Ops 14:1
3. Pathfinder can reduce down to 5:1 with prior coordination with Aviation Commander. TDP size must be reduced first according to mission type (Insertion/Extraction) before attempting to reduce Obstacle Ratio.

G. Atmospherics Condition:

Density Altitude: Humidity, Altitude, Temperature

1. Effects considerations when authorizing the reduction of TDP size
2. As the levels of density altitude increases, the capabilities of the aircraft decreases.

H. Loads: Pathfinders must consider the type of load:

1. Equipment or Personnel
 2. Internal or External
 3. Insertion or Extraction
 4. Weight of the load
- *Can be combined

III. Marking HLS for Day Operations:

A ground guide will mark the PZ or LZ for the lead aircraft by use of a signalman, VS-17, or by other identifiable means.

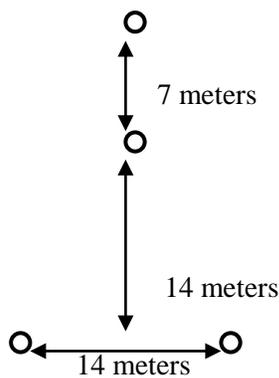
IV. Marking the HLS for Night Operations:

1. Placement of the inverted "Y" or NATO "T" at the #1 TDP.

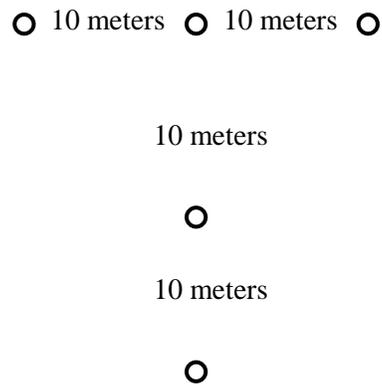
A. Inverted "Y" for cargo aircraft will have 5 lights. The location of the fifth light will be determined through prior coordination with the supporting aviation unit.

B. NATO landing "T" will be utilized if aircraft are approaching the site from 500 feet AGL or above or it is coordinated for. When using a NATO "T" you must add 20 meters to the total length of the site.

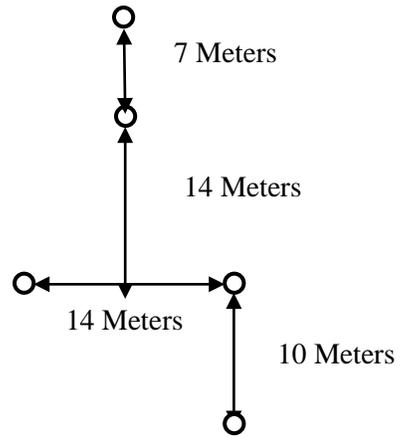
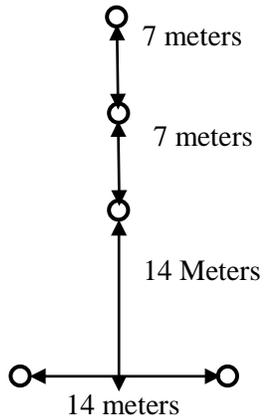
INVERTED "Y"



NATO "T"

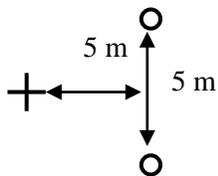


INVERTED "Y" with 5th light (Cargo A/C or when coordinated for)

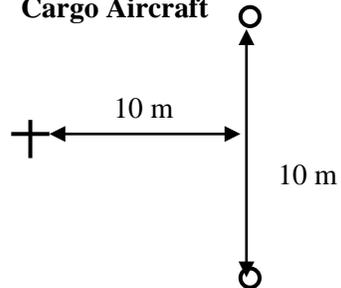


TDP landing lights: Non-Cargo & Cargo:

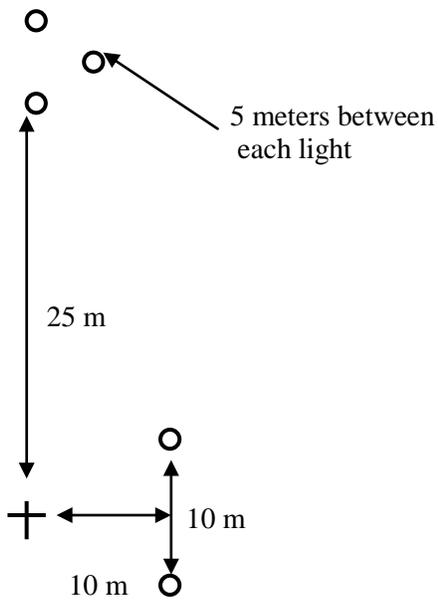
Non-Cargo Aircraft



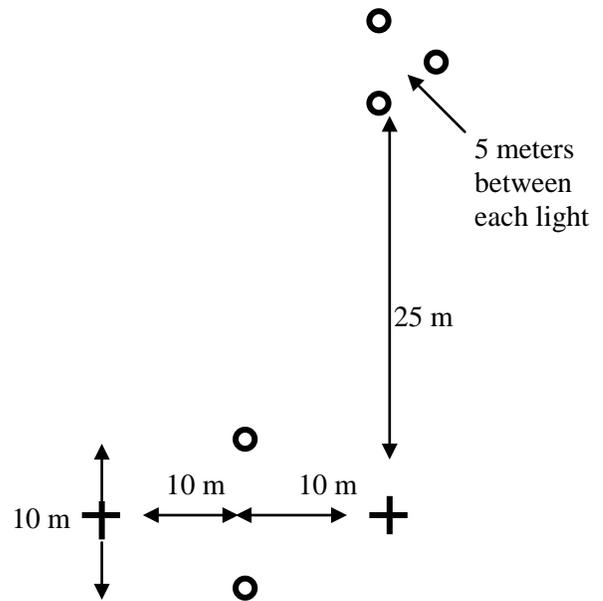
Cargo Aircraft



SLP Landing Lights: Not Landing & Landing



(SL Aircraft is not landing)



(SL Aircraft Landing)

2. Obstacle Lights (Steady Red).

- A. At night red lights will look like white light when wearing NVG's. Aircrew NVGs have filtered lenses. These filters do not allow the aircrews to see blue or green Chemlites. Colors such as yellow, orange, red, and infrared can be seen by pilots wearing ANVIS.
- B. For security, Pathfinders and the ground unit turn off, cover, or turn all lights upside down until the last practical moment before a helicopter arrives. Then they orient the lights in the direction from which the lead helicopter is approaching, and a signalman directs its landing.

V. Establishment of the HLS:

1. Determine the land heading:

- A. Long axis of the site.
- B. Wind direction and speed
- C. Slope at the site

2. Emplace GTA. Consider the following:

- A. 360 degree observation of the site
- B. See incoming Aircraft
- C. Not in a cleared area
- D. Opposite the CCP

NOTE: The site can now accept one aircraft "at a hover."

3. Determine Length and Width

4. Determine Area of Unusable

5. Mark and Clear TDPs:

- A. ATL supervises designation and marking of the TDP's in order, first to last.
- B. Other members of the marking party begin clearing the TDP's.
- C. The GTA and INR update the ATC block of their maps as each point is cleared.
- D. SL point will be located no less than 100 meters from the nearest active TDP.
- E. All TDP's are cleared.

10 minutes prior to mission time the following will be accomplished:

- 1. All radios set to the primary frequency.
- 2. All personnel in the proper uniform and in position to perform their respective duties.
- 3. All signalmen in their proper location ready to guide aircraft.
- 4. ATC blocks of the GTA's and INR's maps are complete, accurate and alike.
- 5. All signaling devices are out and ready for use.

VI. AIR LOADING AND SAFETY:

1. Prepare troops and their equipment for air movement: (BUTWAIT)

- A. Bipods collapsed
- B. Utilize eye protection
- C. Tie down loose equipment
- D. Weapons are on safe; no rounds chambered.
- E. Antennas depressed or removed
- F. Id card/ Id tags worn
- G. Tighten Chinstrap

2. Methods used to approach Army aircraft:

- A. Occupy and secure the PZ and position personnel and equipment for loading.
- B. Approach aircraft only when completely landed.
- C. Approach the aircraft bent over at the waist
- D. If the aircraft has landed on a slope, approach it from the down slope side.

3. Approach the following types of aircraft as indicated:

- A. **UH-1:** Approach from 45 degrees off the front of the aircraft.
- B. **UH-60, MH-6, OH-58:** Approach 90 degrees from the side.
- C. **CH-47, CH-46, and MV-22B:** Approach from 45 degrees from the rear.
- D. **CH-53:** 45 degrees from right rear (Avoid tail rotor)
- E. **UH-72:** 90 degrees from the side and one litter from the rear (Avoid tail rotor)

4. Loading the aircraft and actions while in flight:

- A. Load in reverse order (first in, last out)
- B. Secure all loose items and check all cargo lashings.
- C. **DO NOT** place equipment under troop seats. (Seats designed to collapse)
- D. All seat belts will be fastened and remain fastened during the flight.
- E. All troops will remain seated during the flight.
- F. No smoking is allowed aboard aircraft.
- G. Individual weapons will not be fired from an aircraft at any time.
- H. Individual weapons will be oriented as indicated:
 - Muzzle up** on board UH-1(N/Y) helicopter.
 - Muzzle down** on board UH-60, OH-58 and CH-47 helicopters.

5. Aircraft off-loading procedures:

- A. Do not off-load prior to being instructed to do so by the aircrew.
- B. Do not move toward the rear of observation or utility aircraft due to the tail rotor.
- C. Aircraft on a side slope, exit on the down slope side.
- D. Take 2 to 3 steps and assume a prone position facing away until the aircraft departs

6. Emergency exits:

A/C Type	Number of Emergency Exits	Location
OH-58	2	Crew Doors
UH-1	4	Pilot Doors and Troop Doors
UH-60	6	Cockpit Doors, Crew Windows, Troop Doors
MV-22B	6	Crew Door, Ramp, Pilot Windows, 2 Blow-Out Windows
CH-47	11	Primary (Ramp/Doors) 8 Secondary (Windows)

7. Emergency Landing (Crash) procedures:

1. Bend forward and place your head down.
2. After impact, do not leave the aircraft until the main rotor has stopped turning.
3. Remove first aid kits and fire extinguishers as necessary.
4. Assemble at a pre-designated point and account for each individual.
5. The aircraft troop commander will ensure that all personnel are out of the aircraft

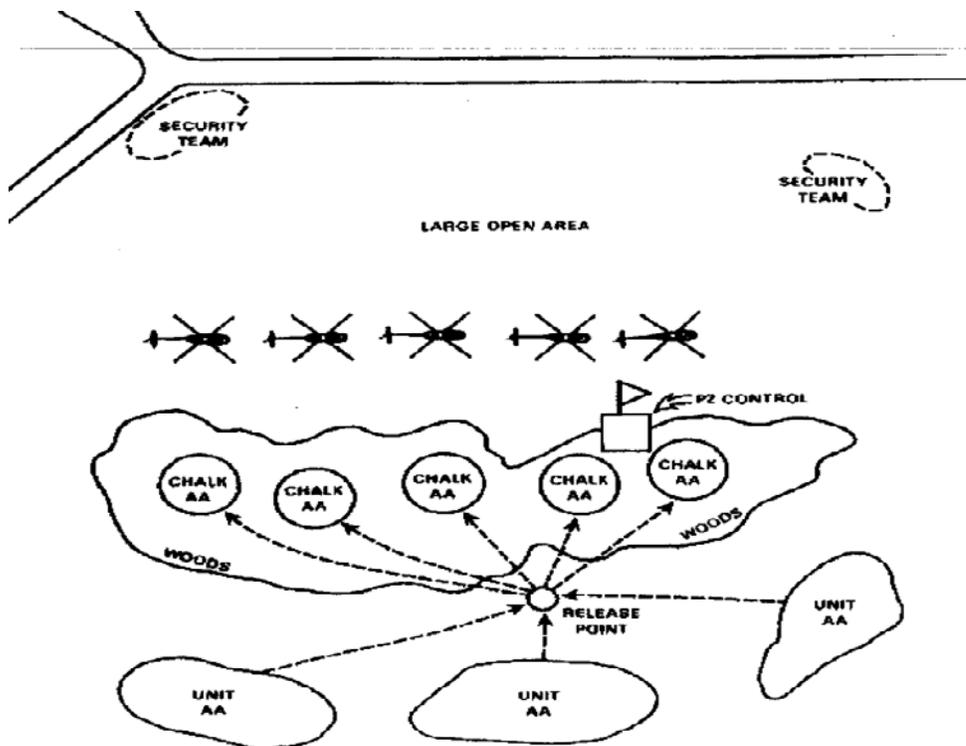
VII. Desert and Winter Operations:

1. **Preferred landing formations are:**
 - a. Echelon Right
 - b. Echelon Left
 - c. These formations will limit the amount of sand /snow taken into the engines of the A/C.
2. **Run-in Landings:** A/C touches down and continues to roll forward to avoid brownout or whiteout conditions
3. **Land-Safe System:** When armed, this system can gradually lower the aircraft to the ground from a hover for a safe landing in low visibility situations. **UH-60M/CH-47F**
4. Sling Load A/C has a distance of 150 Meter separation.

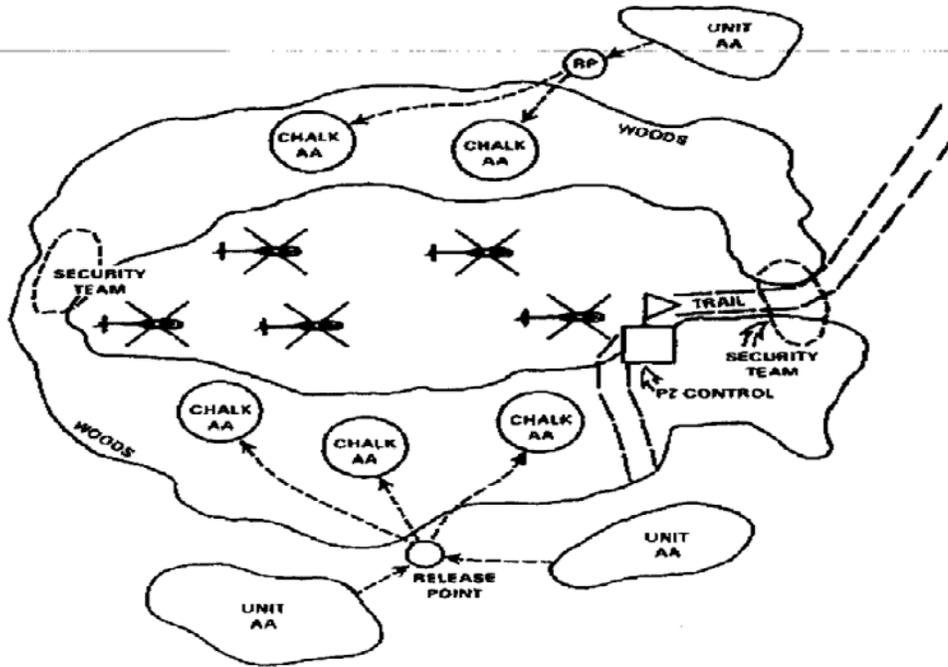
VIII. Pick up Zone

Movement to and occupation of chalk assembly area: Linkup guides from the PZ Control Party will meet with designated units in the unit assembly area and coordinate movement of chalks to a release point. As chalks arrive at the release point, chalk guides will escort each chalk to its assigned chalk assembly area. When operating as part of a larger Air Assault operation, no more than three chalks should be located in the chalk assembly area at one time. Noise and light discipline will be maintained throughout the entire movement in order to maintain the security of the PZ. No personnel should be on the PZ unless loading aircraft, rigging for sling load, or directed by PZ Control.

Example of a one sided PZ.

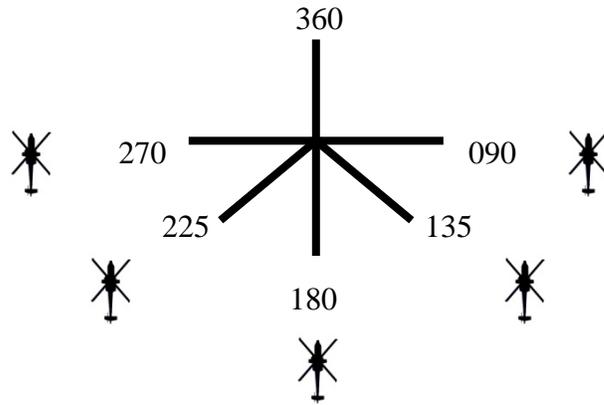


Example of two sided PZ

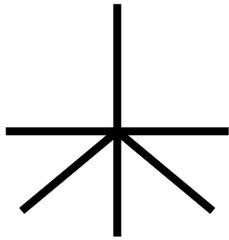


Crows Foot Exercises

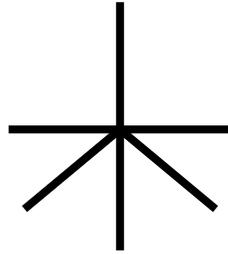
Land Heading- 360



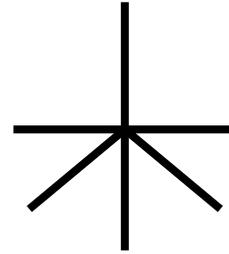
Land Heading- 021



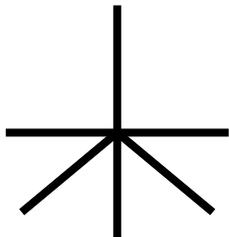
Land Heading-172



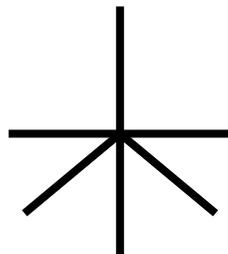
Land Heading-297



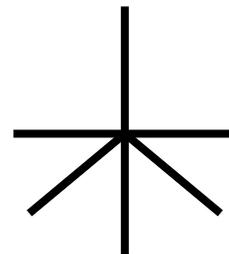
Land Heading- 324



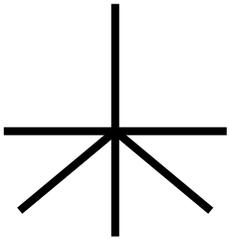
Land Heading-125



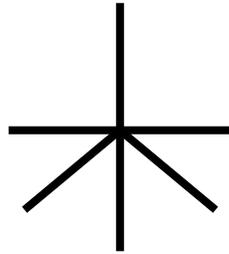
Land Heading-053



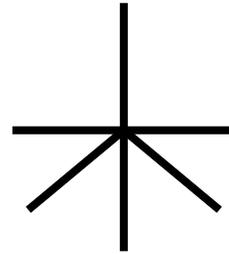
Land Heading- 268



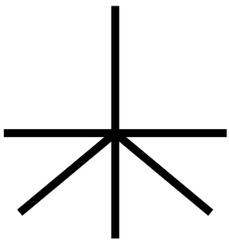
Land Heading- 112



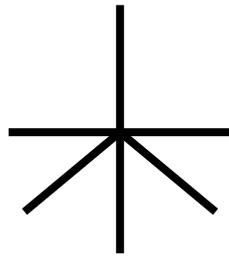
Land Heading-356



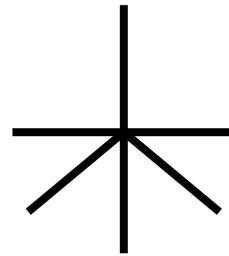
Land Heading- 009



Land Heading- 217



Land Heading-047



SLOPE HOMEWORK

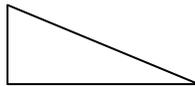
INSTRUCTIONS:

1. Determine the degrees of slope in each problem.
2. Determine which type of aircraft can land.
 If all aircraft can land, answer ALL.
 If no aircraft can land, answer NONE.
3. Determine what advisories must be given and to which aircraft prior to landing, if any.
 “BE ADVISED..... “All no fly areas are in effect”
4. Show your work.

1. HE= 112'

LE= 58'

HD= 200 meters



ANSWER:

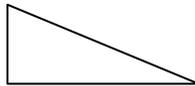
TYPE OF AIRCRAFT:

ADVISORIES:

2. HE= 45'

LE= Sea Level

HD= 200 feet



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES:

3. HE= 462'

LE= 425'

HD= 240 meters



ANSWER:

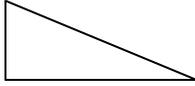
TYPE OF AIRCRAFT:

ADVISORIES:

4. HE= 201'

LE= 60'

HD= 500 feet



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES:

5. HE= 720'

LE= 650'

HD= 100 meters



ANSWER:

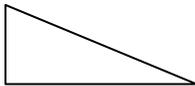
TYPE OF AIRCRAFT:

ADVISORIES:

6. HE= 312'

LE= 50M

HD= 1200M



ANSWER:

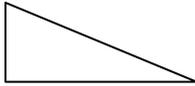
TYPE OF AIRCRAFT:

ADVISORIES:

7. HE= 360M

LE= 220M

HD= 4200'



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES:

8. HE= 670'

LE= 240'

HD= 1110M



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES:

9. HE= 110M

LE= 37M

HD= 400M



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES:

10. HE= 390'

LE= 233'

HD= 4200'



ANSWER:

TYPE OF AIRCRAFT:

ADVISORIES: