

- OBJECTIVE**
- To familiarize the student with normal and crosswind takeoff and climb from a hover, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor
- CONTENT**
- Introduction, performance factors and HV-diagram
 - Control function and RPM control
 - Preparation, checks and correct hover height
 - Technique, ETL and Transverse flow effect
 - Crosswind adjustments
 - Common errors and hazards incl. wind shear & wake turbulence
- SCHEDULE**
- | | |
|----------------------------|----|
| - Pre-flight Discussion | 20 |
| - Instructor Demonstration | 15 |
| - Student Practice | 30 |
| - Post-flight Critique | 10 |
- EQUIPMENT**
- Whiteboard + pens for pre & Post-flight discussions
 - Helicopter model
- INSTRUCTOR'S ACTIONS**
- Pre-flight – Discuss lesson objective
 - In-flight – Demonstrate maneuver in head and cross wind conditions and coach student practice
 - Post-flight – Critique and evaluate student performance
- STUDENT'S ACTIONS**
- Pre-flight – Discuss lesson objective and ask questions
 - In-flight – Perform new maneuver as directed
 - Post-flight – Ask pertinent questions
- COMPLETION STANDARDS**
- Student should demonstrate knowledge of elements related to maneuvers including performance factors and HV-diagram
 - Establish stationary hover prior to takeoff in head and crosswind
 - Maintain RPM within limits
 - Accelerate to recommended climb airspeed +/- 10kts
 - Maintain proper ground track with crosswind correction
 - Remain aware of wind shear and/or wake turbulence
 - Complete checks

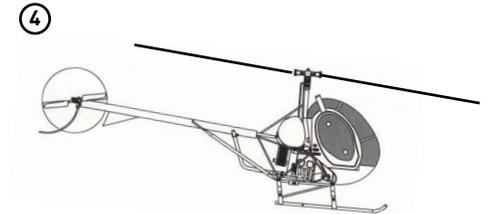
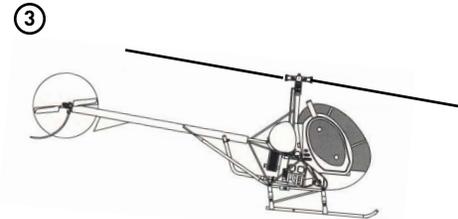
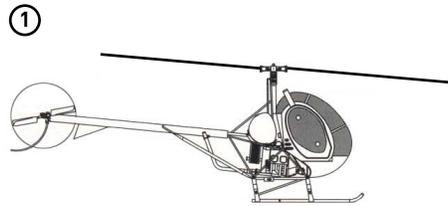
DEFINITION

- Transition from a hover to a climb over a specified ground track, increasing altitude safely and expeditiously
- Avoiding the crosshatched or shaded areas of the height/velocity diagram

CONTROLS

- CYCLIC Attitude, Airspeed, Ground track, Correct for drift
- COLLECTIVE Power setting, Altitude
- PEDALS Heading, Trim
- THROTTLE RPM

TECHNIQUE



① Hover

- Steady 3-5 feet hover
- Check wind direction and speed
- Clearing turn
- Clear takeoff path
- Take-off checks
- Ease cyclic forward

② Acceleration

- At vibrations of ETL, tip path plane on horizon to 35 knots
- Two finger attitude, 70 knots
- Continuously push the cyclic forward to counteract blowback
- Left cyclic, due to transverse flow effect and translating tendency
- Keep heading with pedals, in case of an engine failure
- Correct for crosswind with cyclic to maintain ground track
- Accelerate to 55 knots, aft cyclic to a four finger attitude, 55 knots

③ Trim

- At 100 feet indicated altitude, trim helicopter with pedals

④ Climb

- Maintain the four finger attitude, 55 knots
- Set cruise power, 27" MAP

ERRORS

- Altitude before airspeed
- Ground track
- Airspeed during the climb
- RPM control
- Over controlling

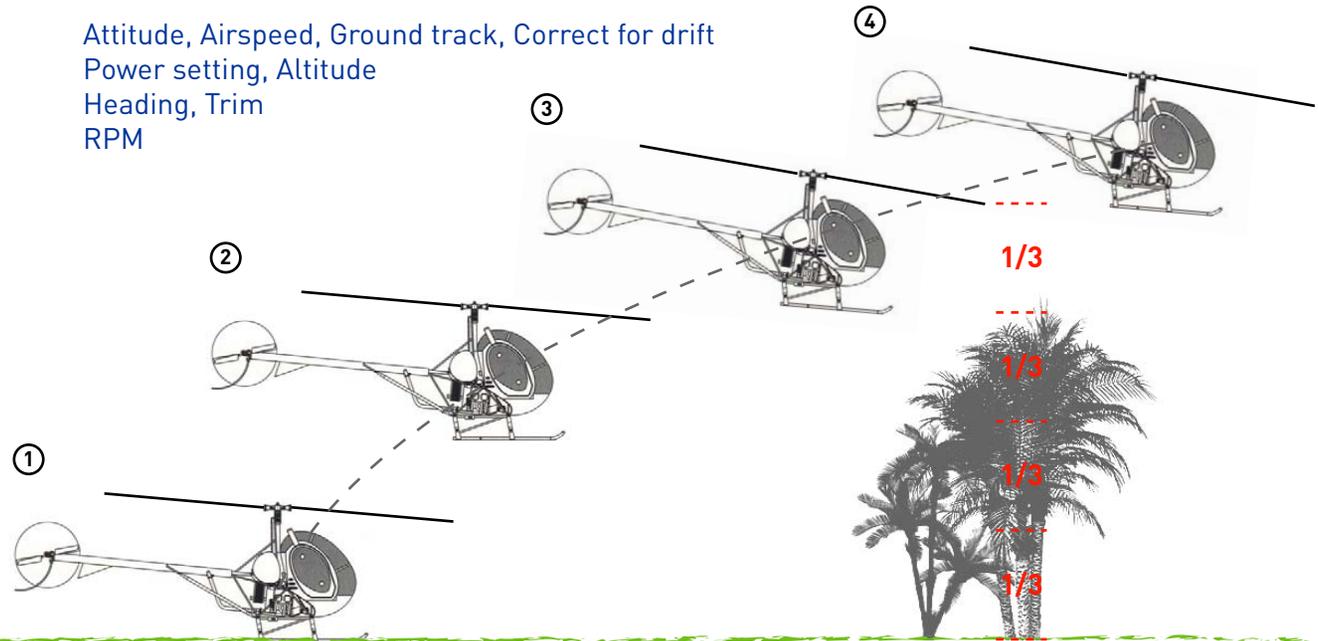
- OBJECTIVE**
- Familiarize the student with max performance takeoff and climb from a hover or the ground, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor
- CONTENT**
- Introduction, where to use max performance takeoff
 - Performance factors and HV-diagram
 - Control function and RPM control
 - Preparation and checks
 - Technique
 - Crosswind adjustments
 - Common errors and hazards incl. wind shear and wake turbulence
- SCHEDULE**
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- Pre-flight - Discuss lesson objective
 - In-flight - Demonstrate maneuver in head and cross wind conditions and coach student practice
 - Post-flight - Critique and evaluate student performance
- STUDENT'S ACTIONS**
- Pre-flight - Discuss lesson objective and ask questions
 - In-flight - Perform new maneuver as directed
 - Post-flight - Ask pertinent questions
- COMPLETION STANDARDS**
- Student should demonstrate knowledge of elements related to maneuver and know where it's recommended, performance factors and HV-diagram
 - Use proper control technique to initiate takeoff and fwd climb att.
 - Maintain RPM within limits
 - Use max available takeoff power
 - After clearing obstacles transition to normal climb attitude + airspeed, +-10kts, and power setting
 - Maintain proper ground track with crosswind correction
 - Remain aware of wind shear and/or wake turbulence
 - Complete checks

OBJECTIVE - Used to climb at a steep angle to clear obstacles in the flight path

CONTROLS

- CYCLIC Attitude, Airspeed, Ground track, Correct for drift
- COLLECTIVE Power setting, Altitude
- PEDALS Heading, Trim
- THROTTLE RPM

TECHNIQUE



- ① Ground**
- Steady 3-5 feet hover
 - Hover power check
 - Check wind direction and speed
 - Clearing turn
 - Set down into wind
 - Mag drop check
 - Visualize and clear takeoff path
 - Clear skids
 - Takeoff checks
 - RPM in the top of the green

- ② Takeoff**
- Raise collective slowly
 - Lead with throttle to keep RPM in the top of the green
 - Use left pedal to keep heading
 - Push cyclic slightly forward as distance to obstacle allows to make use of translational lift
 - Continue to raise collective until maximum power is reached

- ③ Clear of obstacle**
- Use 1/3 rule
 - Push cyclic forward to get two finger attitude, 70 knots
 - Gain forward airspeed

- ④ Climb**
- Accelerate to 55 knots, aft cyclic to a four finger attitude, 55 knots climb
 - When we have a forced landing area, lower collective to cruise power, 27" MAP
 - Trim helicopter with pedals

- ERRORS**
- Misjudging performance
 - Operating inside H/V diagram
 - Too vertical or too horizontal takeoff path

- RPM control
- Over controlling

- Failure to resume normal climb and airspeed after clearing obstacle

OBJECTIVE - Familiarize the student with running takeoff from the ground, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor

CONTENT

- Introduction, where to use running takeoff
- Performance factors and HV-diagram
- Control function and RPM control
- Preparation and checks
- Technique
- Crosswind adjustments
- Common errors and hazards incl. wind shear and wake turbulence

SCHEDULE

- Pre-flight Discussion	20
- Instructor Demonstration	15
- Student Practice	30
- Post-flight Critique	10

EQUIPMENT

- Whiteboard + pens for pre- and post-flight discussions
- Helicopter model

INSTRUCTOR'S ACTIONS

- Pre-flight - Discuss lesson objective
- In-flight - Demonstrate maneuver in head or cross wind conditions and coach student practice
- Post-flight - Critique and evaluate student performance

STUDENT'S ACTIONS

- Pre-flight - Discuss lesson objective and ask questions
- In-flight - Perform new maneuver as directed
- Post-flight - Ask pertinent questions

COMPLETION STANDARDS

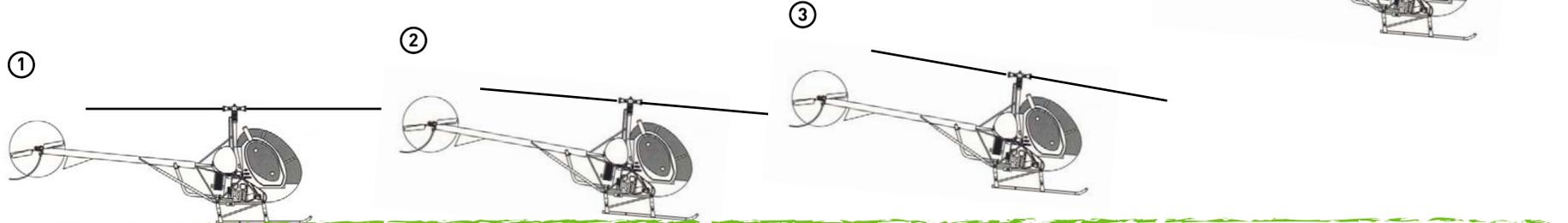
- Student should demonstrate knowledge of elements related to maneuver and know where it's recommended, performance factors and HV-diagram
- Use proper preparatory technique prior to initiating takeoff
- Maintain RPM within limits
- Initiates forward accelerating movement on the surface
- Transition to normal climb attitude + airspeed, +-10kts, and power setting
- Maintain proper ground track with crosswind correction
- Remain aware of wind shear and/or wake turbulence
- Complete checks

OBJECTIVE - Used when load and/or density altitude prevent a sustained hover at normal hovering height

CONTROLS

- CYCLIC Ground track, Correct for drift
- COLLECTIVE Power setting
- PEDALS Heading
- THROTTLE RPM

TECHNIQUE



- ① Ground**
- Steady 3-5 feet hover
 - Hover power check and use 1-2" less for the takeoff
 - Check wind direction and speed
 - Clearing turn
 - Set down on hard surface can be done on grass
 - Visualize and clear takeoff path
 - Takeoff checks
 - RPM in the top of the green
 - Raise collective until light on the skids

- ② Accelerate**
- Raise collective slowly to maximum limited power
 - Initiate movement with cyclic
 - Lateral cyclic to prevent drift
 - Maintain heading with pedals

- ③ Takeoff**
- When ETL is reached the helicopter becomes airborne
 - Maintain an altitude to take advantage of the ground cushion

- ④ Climb**
- Accelerate to 55 knots, aft cyclic to a four finger attitude, 55 knots climb
 - At 100 feet raise collective to climb power, 27" MAP
 - At 100 feet trim helicopter with pedals

- ERRORS**
- Not aligning heading and ground track
 - Raising collective (Overpitching)
 - RPM control

- Airborne before ETL
- Too much forward cyclic during surface run

- Lowering nose to much settling back to surface
- Altitude before airspeed

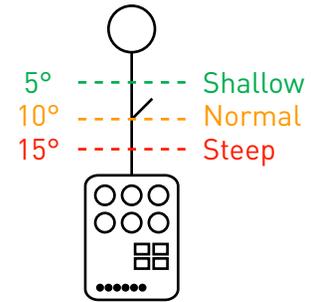
HAZARDS - Dynamic rollover

- OBJECTIVE**
- Familiarize the student with normal and crosswind approach to a hover or the surface, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor
- CONTENT**
- Introduction, performance factors and HV-diagram
 - Control function and RPM control
 - Preparation and checks
 - Technique, site picture, ETL and go around
 - Crosswind adjustments
 - Common errors and hazards incl. SWP, wind shear and wake turbulence
- SCHEDULE**
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 - Post-flight - Critique and evaluate student performance
- STUDENT'S ACTIONS**
- Pre-flight - Discuss lesson objective and ask questions
 - In-flight - Perform maneuver as directed
 - Post-flight - Ask pertinent questions
- COMPLETION STANDARDS**
- Student should demonstrate knowledge of elements related to maneuvers including performance factors (and HV-diagram)
 - Consider wind conditions, landing surface and obstacles
 - Select suitable termination point
 - Establish and maintain proper approach angle and rate of closure
 - Remain aware of wind shear and/or wake turbulence
 - Avoid situations that may result in SWP
 - Maintain proper ground track with crosswind correction
 - Arrive at termination point within +/-4 feet
 - Complete checks

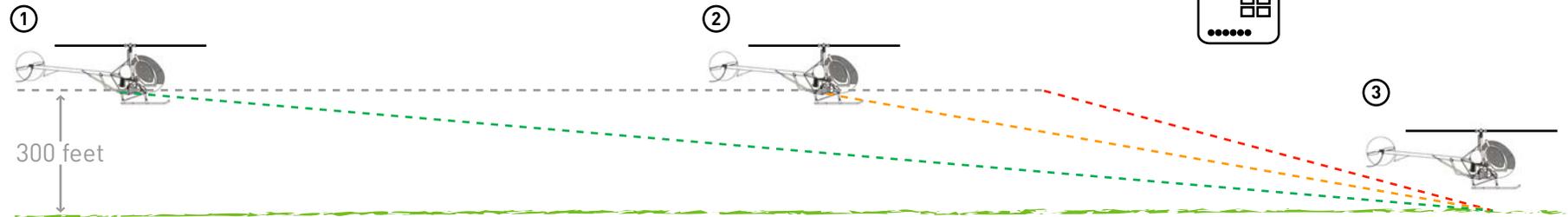
OBJECTIVE - A transition from traffic pattern altitude to a hover with the rate of descent and groundspeed reaching zero at the same time

CONTROLS

- CYCLIC Rate of closure, Ground track, Correct for drift
- COLLECTIVE Rate of descent
- PEDALS Trim, Heading
- THROTTLE RPM



TECHNIQUE



- ① Final approach**
- 300 feet AGL
 - Constant apparent groundspeed
 - Normal walking pace
 - Level flight
 - Wait for gate position

- ② Gate position**
- The normal angle is achieved when the spot is level with the trim string
 - Initiate the descent by lowering collective, decreasing power to approximately 18"
 - Use collective to control the rate of descent
 - Aft cyclic as the nose will pitch down
 - Use the cyclic to control the rate of closure
 - Maintain an apparent groundspeed of a normal walking pace
 - Use pedals to keep the aircraft in trim
 - At 200 feet AGL turn carburetor heat off
 - At 100 feet AGL align with ground track

- ③ Termination**
- As we begin to lose effective translational lift we have to raise collective to compensate
 - Lead with the throttle to keep RPM in the green
 - Add left pedal to keep the heading
 - Forward cyclic as the nose will pitch up when collective is raised
 - Maintain hover height with collective
 - Increase throttle to keep RPM in the green
 - Aft cyclic to stop forward movement
 - Control heading with pedals

ERRORS

- RPM control
- Approach angle
- Improper use of pedals
- Not coordinating airspeed and altitude
- Low RPM when at the hover
- Too much aft cyclic, low tail rotor

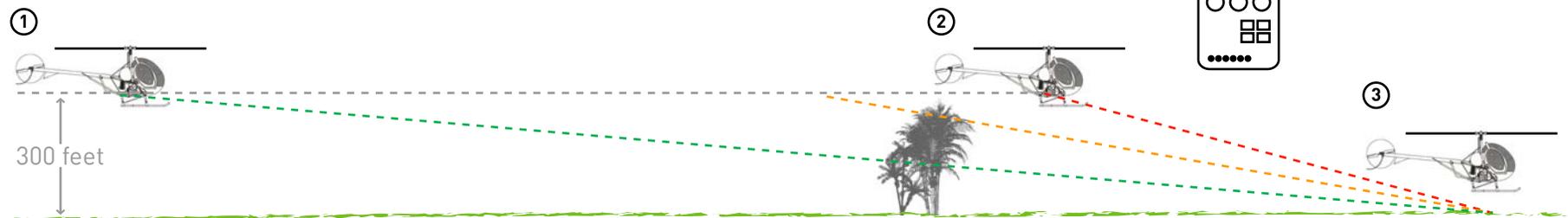
OBJECTIVE	- Familiarize the student with steep approach to a hover or the surface, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor								
CONTENT	<ul style="list-style-type: none"> - Introduction, performance factors (and HV-diagram), where used - Control function and RPM control - Preparation and checks - Technique, site picture, ETL and go around - Crosswind adjustments - Common errors and hazards incl. SWP, wind shear and wake turbulence 								
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INSTRUCTOR'S ACTIONS	<ul style="list-style-type: none"> - Pre-flight - Discuss lesson objective - In-flight - Demonstrate maneuver in head or cross wind conditions and coach student practice - Post-flight - Critique and evaluate student performance 								
STUDENT'S ACTIONS	<ul style="list-style-type: none"> - Pre-flight - Discuss lesson objective and ask questions - In-flight - Review normal approach and perform new maneuver as directed - Post-flight - Ask pertinent questions 								
COMPLETION STANDARDS	<ul style="list-style-type: none"> - Student should demonstrate knowledge of elements related to maneuver including performance factors (and HV-diagram) - Consider where it's recommended, wind conditions, landing surface and obstacles - Select suitable termination point - Establish and maintain proper approach angle (max15°) and RofC - Remain aware of wind shear and/or wake turbulence - Avoid situations that may result in SWP - Maintain proper ground track with crosswind correction - Arrive at termination point stabilized within +-4 feet - Complete checks 								

OBJECTIVE - Used primarily when there are obstacles in the approach path that are too high to allow a normal approach

CONTROLS

- CYCLIC Rate of closure, Ground track, Correct for drift
- COLLECTIVE Rate of descent
- PEDALS Trim, Heading
- THROTTLE RPM

TECHNIQUE



- ① **Final approach**
- 300 feet AGL
 - Constant apparent groundspeed
 - Slow walking pace
 - Level flight
 - Wait for gate position

- ② **Gate position**
- When the spot is between the trim string and the top of the console, we are steep
 - Initiate the descent by lowering collective, decreasing power to approximately 18"
 - Use collective to control the rate of descent
 - Aft cyclic as the nose will pitch down
 - Use the cyclic to control the rate of closure
 - Maintain an apparent groundspeed of a slow walking pace
 - Use pedals to keep the aircraft in trim
 - At 200 feet AGL turn carburetor heat off
 - At 100 feet AGL align with ground track

- ③ **Termination**
- As we begin to lose effective translational lift we have to raise collective to compensate
 - Lead with the throttle to keep RPM in the green
 - Add left pedal to keep the heading
 - Forward cyclic as the nose will pitch up when collective is raised
 - Maintain hover height with collective
 - Increase throttle, RPM in the green
 - Aft cyclic to stop forward movement
 - Control heading with pedals

ERRORS

- RPM control
- Approach angle
- Improper use of pedals
- Slowing down to keep the steep angle
- Not noticing when ETL is lost
- Not coordinating airspeed and altitude

- Low RPM when at the hover
- Too much aft cyclic, low tail rotor

HAZARDS

- Settling with power
- H/V diagram

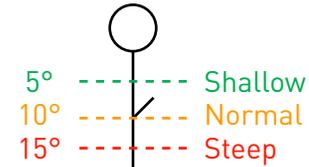
OBJECTIVE	- Familiarize the student with shallow approach and running landing, the preparation and techniques. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor								
CONTENT	<ul style="list-style-type: none"> - Introduction, performance factors (and HV-diagram and power curve), purpose of maneuver and different surface textures - Control function and RPM control - Preparation and checks - Technique, site picture, ETL and go around - Crosswind adjustments - Common errors and hazards including dynamic rollover, ground resonance, wind shear and wake turbulence 								
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INSTRUCTOR'S ACTIONS	<ul style="list-style-type: none"> - Pre-flight - Discuss lesson objective - In-flight - Demonstrate maneuver in head or cross wind conditions and coach student practice - Post-flight - Critique and evaluate student performance 								
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COMPLETION STANDARDS	<ul style="list-style-type: none"> - Student should demonstrate knowledge of elements related to maneuver including purpose of maneuver, performance factors (and HV-info) and effect of surface texture - Maintain RPM within limits - Consider obstacles and other hazards - Establish and maintain proper approach angle(5-8°)and RofC - Remain aware of wind shear and/or wake turbulence - Maintain proper ground track with crosswind correction - Maintain a speed that will take advantage of ETL during surface contact, landing skids parallel to ground track - Utilize proper flight control technique after surface contact - Complete checks 								

OBJECTIVE

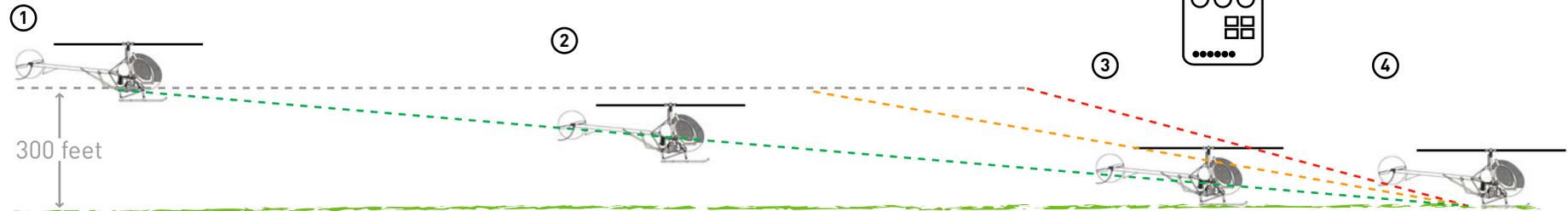
- Landing in high density altitude or high gross weight conditions, with insufficient power to hover, using ETL
- Can also be used in emergencies as stuck pedal or partial power failure

CONTROLS

- CYCLIC Rate of closure, Ground track, Correct for drift
- COLLECTIVE Rate of descent, Cushion touchdown
- PEDALS Trim, Heading
- THROTTLE RPM



TECHNIQUE



① Final approach

- 300 feet AGL
- Constant apparent groundspeed
- Fast walking pace always above ETL
- Level flight
- Wait for gate position
- When the spot is between the compass and the trim string, we are shallow

② Gate position

- Initiate the descent by lowering collective, decreasing power to approximately 20"
- Use collective to control the rate of descent
- Aft cyclic as the nose will pitch down
- Use the cyclic to control the rate of closure
- Maintain an apparent groundspeed of a fast walking pace
- Use pedals to keep the aircraft in trim
- At 200 feet AGL turn carburetor heat off
- At 100 feet AGL align with ground track

③ Touchdown

- Maintain an airspeed above ETL, by keeping the vibrations
- Level the aircraft with forward cyclic
- Cushion touchdown with collective

④ Groundslide

- No movement of the collective, can be lowered slightly to increase braking
- Keep straight ground track with pedals
- Maintain RPM in the green with throttle

ERRORS

- Approach angle
- Loosing ETL
- Nose high attitude near ground to slow down
- Hard landing
- Directional control on touchdown and ground slide
- Touch down too fast
- Not level on touchdown
- RPM control during and after touchdown
- Aft cyclic during groundside

HAZARDS

- Dynamic rollover
- Ground resonance
- Tail boom strike

OBJECTIVE	- To familiarize the student with go around procedure, use and technique. Demonstrate maneuver and have student safely execute the maneuver at first with help from instructor. In the end, at least once with as little help as possible from instructor
CONTENT	- Introduction, HV-diagram, purpose of maneuver and different scenarios - Control function and RPM control - Technique and ETL - Crosswind adjustments - Common errors and hazards incl. SWP, downdraft, wind shear and wake turbulence
SCHEDULE	- Pre-flight Discussion 20 - Instructor Demonstration 15 - Student Practice 30 - Post-flight Critique 10
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INSTRUCTOR'S ACTIONS	- Pre-flight - Discuss lesson objective - In-flight - Demonstrate maneuver in head or cross wind conditions and coach student practice - Post-flight - Critique and evaluate student performance
STUDENT'S ACTIONS	- Pre-flight - Discuss lesson objective and ask questions - In-flight - Review normal approach and perform new maneuver as directed - Post-flight - Ask pertinent questions
COMPLETION STANDARDS	- Student should demonstrate knowledge of elements related to maneuver and when it's necessary - Make timely decision to discontinue approach to landing - Maintain RPM within limits - Establishes proper control input to stop descent and initiate climb - Maintain proper ground track with crosswind correction - Transition to a normal climb speed +/-10kts

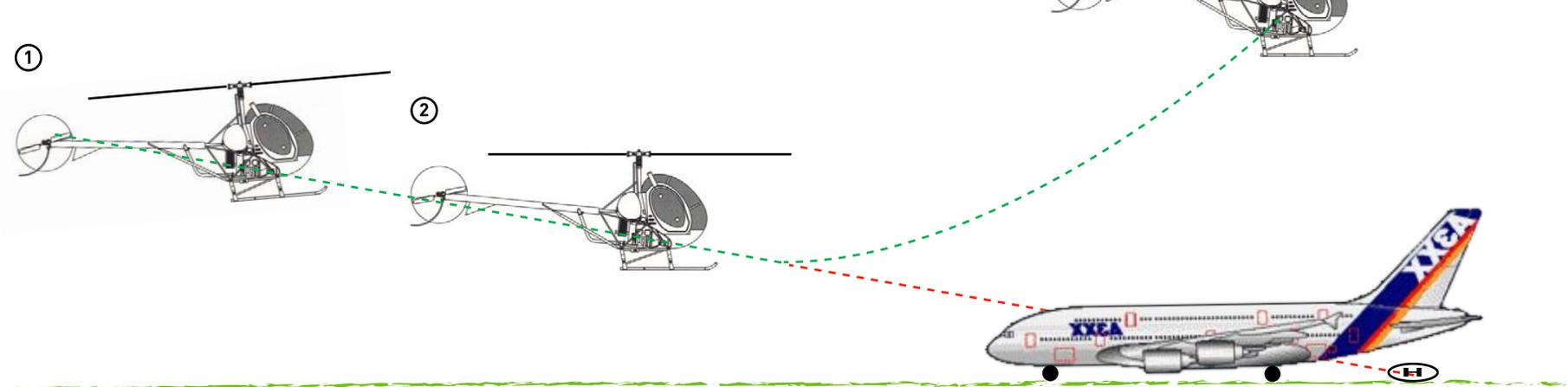
OBJECTIVE

- To abort an approach for a number of different reasons:
- You feel uncomfortable
- Misjudged approach
- Potentially dangerous approach
- Traffic conflict occurs
- ATC advises you

CONTROLS

- CYCLIC Airspeed, Ground track
- COLLECTIVE Arrest descend, Initiate climb
- PEDALS Trim, Heading
- THROTTLE RPM

TECHNIQUE



- ① Recognition**
- Don't hesitate
 - Don't make a bad situation worse
 - If in doubt; There is no doubt

- ② Transition**
- Carb heat off - if time permits
 - Raise collective and bring in normal cruise power to arrest rate of descent
 - Lead with throttle to keep RPM in the green
 - Left pedal to maintain heading

- ③ Climb**
- Aft cyclic to a 4 finger attitude, 55 knots
 - Call tower - "N2044D is going around"

ERRORS

- Not going around due to pride
- Not recognizing the danger
- Not coordination controls

TIP & TRICKS

- AVIATE, NAVIGATE, COMMUNICATE
- It's never a bad decision to go around!