HelicopterSchoolPart2 (V1.0)

created on 10.05.2024

Estimated flight duration 15 to 30min. Per exercise

Difficulty level easy-difficult (depending on flight mode)

Task: Train climb/descent/speed, turns and quick stop.

Introduction:

In the helicopter school part 2 you will learn to climb/descend at a constant speed and climb/descent rate. You will also fly turns with different bank angles. Finally, you will practise the quick stop.

Read the training documents from Bernhard, a former helicopter pilot in the German Armed Forces and flight instructor on the AL II, in advance.

You have already practiced hovering in HelicopterSchoolPart1.

Start:

You are in South East Asia, at Seletar Airport (WSSL), near Singapore.
It's sunny and windless, ideal for practicing.
Your helicopter, a Robinson R22, is in the center of the hover square with the engine running.

As soon as the boost pressure is stable, you can choose which exercise you want to do:

1 - Climb/descent/speed

2 - Curves/steep curves

3 - Quickstop

4 - Quickstop with 180 degree turn

Depending on the exercise, it continues differently:

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1 - Climb/descent/speed

This exercise trains climbing and descending flights with a constant climb/descent rate (500ft/min).
It shows what happens when the pitch remains unchanged during climb/descent.
Afterwards, the stick remains unchanged in terms of forward/backward movement and climb/descent is only controlled with the pitch.

Select the level of difficulty:

Light (tolerant of speed, altitude, climb rate, etc.)
Optional (the following will be complained about but tolerated):
- Hold the specified altitude (+/-100ft)
- Hold the specified speed (+/-10Kn)
- Maintain the specified climb rate (+/-300ft/min.)

Hard (adhere to all specifications)
After take-off, you have time to bring the helicopter up to the required speed and climb rate up to an altitude of 300 feet.
After that, these specifications apply:
- Hold the specified altitude (+/-50ft)
- Hold the specified speed (+/-5Kn)
- Maintain the specified climb rate (+/-200ft/min.)
- Land exactly in the center of the square (radius 9.8Ft/3m)
- Land in a northerly direction (+/-15 degrees)

Problem with the climb/sink rate display:
The display is not correct, so it is almost impossible to maintain the "heavy" (+/-200Ft) setting.
Often the flight will fail because you have supposedly flown "too low".

This is what 500Ft/min normally looks like:
According to the "tool text" (at the bottom of the picture) only 430 Ft/min.

Display at actual climb rate:
300Ft/min 500Ft/min 700Ft/min



More details below, in the tips section.

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2 - Curves/steep curves

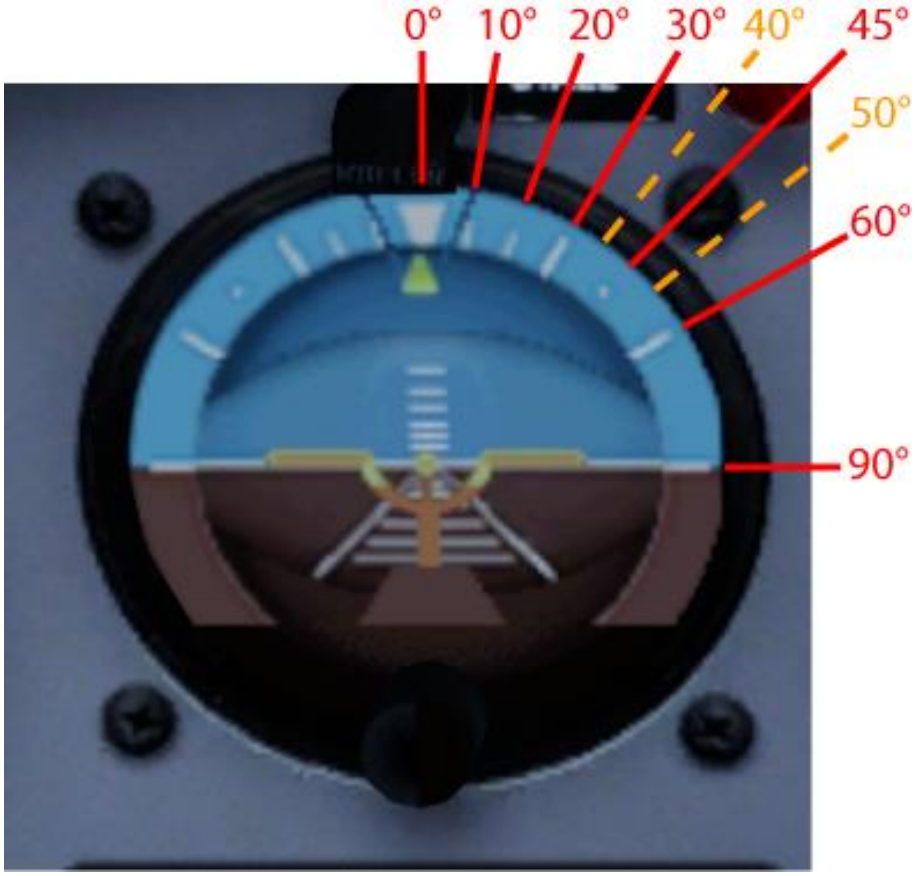
This exercise involves flying turns with bank angles of 10, 20 and 30 degrees.
A 180 degree turn is flown in each case.
One turn must be flown in descent at a constant -500ft/min.

You can then train steep turns with a bank of more than 30 degrees as you wish.

You can hold these steep turns for as long as you like (several 360 degree turns).

Turns with a bank of 30 degrees or more are practiced here, but not monitored (the "Speed/altitude/bank" settings are deactivated).
It is very difficult or even impossible to adhere to the guidelines in these turns.
Such turns are also called steep turns and, according to flight instructor Bernhard, these are not practiced in normal helicopter training.

Here is an overview of the inclined positions:



Wähle den Schwierigkeitsgrad:

Light (tolerant of speed, altitude, climb rate, etc.)
When hovering at the beginning, the following is monitored:
- Do not leave the HoverCenter (radius 20Ft/6m).
- Do not hover higher than 15Ft/4.5m.
- Do not touch the ground.
- Keep north direction +/-15 degrees.

The following is complained about during the flight, but tolerated:
- Hold the specified altitude (+/-100ft)
- Hold the specified speed (+/-10Kn)
- Hold the specified climb rate (+/-300ft/min.)
- Hold the specified bank (+/-5 degrees)

At the end of the landing:

- Land in the center of the square (radius 20Ft/6m)
- Land in north direction (+/-15 degrees)

Hard (stick to all guidelines)
When hovering at the beginning, the following must be observed:
- Do not leave the HoverCenter (radius 15Ft/4.5m).
- Do not hover higher than 10Ft/3m.
- Do not touch the ground.
- Keep north direction +/-15 degrees.

After take-off, you have time to bring the helicopter up to the required speed and climb rate up to an altitude of 300 feet.
After that, these specifications apply:
- Hold the specified altitude (+/-50ft)
- Hold the specified speed (+/-5Kn)
- Hold the specified climb rate (+/-200ft/min.)
- Hold the specified bank (+/-5 degrees)

At the end of the landing:
- Land exactly in the center of the square (radius 9.8Ft/3m)
- Land in north direction (+/-15 degrees)

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Notes:

1) At the beginning, your hovering skills are checked.
If you don't manage to hover on the spot for 30-60 seconds, I recommend completing HelicopterSchoolPart1 again.

2) If you are of the opinion that my guidelines for the "difficult" mode are impossible to follow because you still can't do it after 10 attempts:
The only thing that helps is practicing, practicing, practicing...
The helicopter license requires approx. 40 flying hours.
- You should spend 10 flying hours on hovering alone (HelicopterSchoolPart1).
- How many hours have you already spent on HelicopterSchoolPart2?

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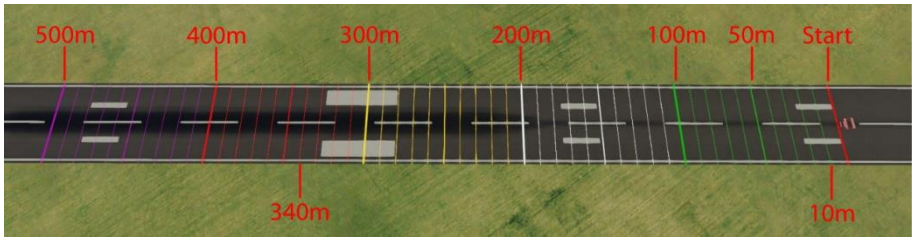
4 - Quickstop

In this exercise, you train the quick stop. This means stopping quickly without climbing or descending.

There are always situations where you have to stop immediately (sudden obstacle, e.g. aircraft on the taxiway).
Climbing should be avoided because obstacles (power line, cable car, approaching aircraft, etc.) may be in the way.
Descending should be avoided because the ground may not be suitable for landing at low altitude and the helicopter does not particularly like contact with the ground at high speed.

This is why fast stopping must be practiced.
I have placed marker lines in this exercise so that you can estimate how long you will need to stop.



This is not a competition to see who can stop the fastest, it's just good to know how many meters/feet you actually need to stop.
Adapting your speed is just as important when flying as it is on the road!

First you can choose whether you want to see the stopping distance:
Yes (lines on the ground and text tell you the braking distance)
No (lines and text disabled)

Then select the difficulty level:
Easy (30Ft above ground, ground contact allowed.)
Hard (10Ft above the ground, ground contact prohibited.)

Now select whether you want help with the approach.
1 - Activate all gates up to the quick stop.
2 - Only the gate at the Quickstop is active.

More details on Quickstop below.

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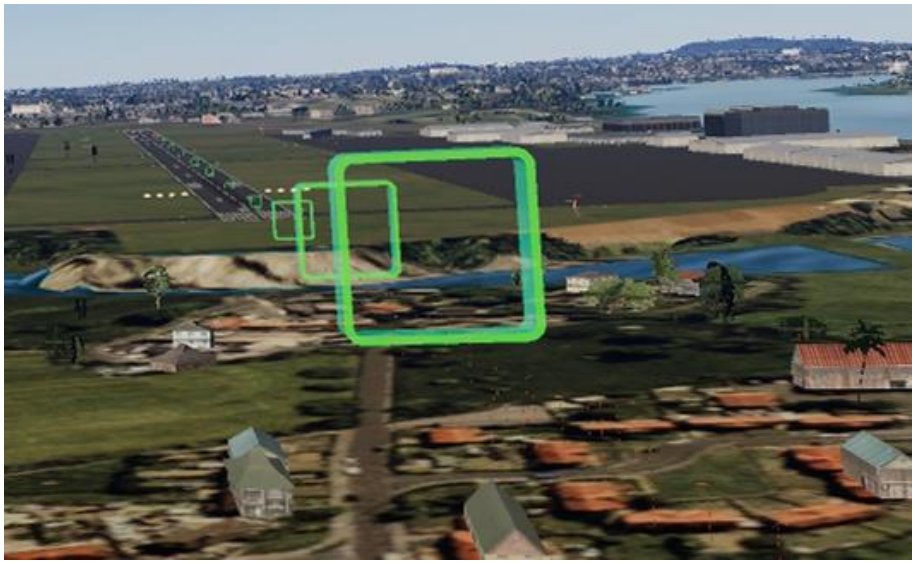
4 - Quickstop with 180 degree turn

The same conditions apply as for the quickstop, with the difference that you make a 180 degree turn during deceleration and then land in the opposite direction.
The 180 degree turn should be made on the same line as the approach, i.e. not off to the side if possible.
You must not leave the side of the runway during the turn.

Details of the quick stop

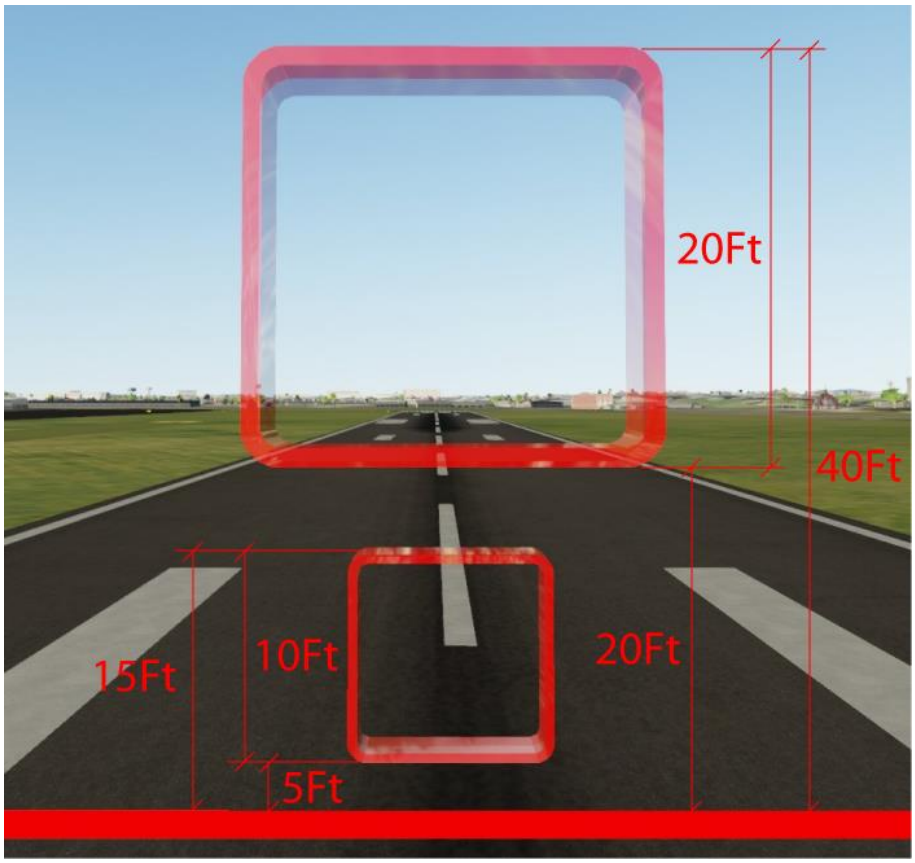
The quick stop is practiced on the runway.
Follow the approach signs to the runway so that you can adapt the helicopter perfectly to your speed and altitude.
You do not have to fly exactly through the approach signs, they only serve as an approach aid.

There are gates in front of and on the runway which guide you to the quick stop.
It doesn't matter if you touch the gates or don't fly through them, they will only guide you to the correct altitude.



The quick stop begins at the red gate.

Depending on the difficulty level, the gates have different sizes and positions.
The large goal is active in "easy" mode, the small one in "difficult" mode.



You must fly through the red gate with the following values:
- Altitude (Light 20-40Ft, Heavy 5-15Ft)
- Speed 80 knots (+/-2.5Kn)
- Flight direction 213 (+/-15 degrees)

Then start the quick stop:
- Light: When slowing down, you may climb to a maximum altitude of 60Ft, or descend to the ground.
- Hard: When slowing down, you may climb to a maximum height of 30 feet and touching the ground is prohibited.

Quickstop with 180 degree turn:
Start the quickstop at the red gate and initiate the 180 degree turn at approximately 50 knots.
The same conditions apply as for the quick stop, plus:
- Slow down and start the turn at approx. 50 knots (under 30 knots is too late).
- Do not "over-turn", i.e. do not turn more than 180 degrees.
- Do not leave the side of the runway.
- Landing in the opposite direction (heading 33, +/-15 degrees)

Remark:
I know, because it is called a "quick stop", you are tempted to stop quickly.

Even though it's called a quick stop, it doesn't mean that you have to lower the pitch quickly, pull the stick back hard and come to a stop after a few meters.
Therefore, **slowly** lower the pitch at the start of the quick stop and compensate the height with the stick.
Take your time with this. Once you have mastered the quick stop, you can try stopping faster.

Tips:

1) If the helicopter seems like a wild bull at the beginning and you can't get a grip on the helicopter due to a lack of "PoPometer" (the feeling in your body), a second display window with an external view of the helicopter may help.
I consider such a display (at the beginning) to be legitimate, because this display only compensates for the missing "popometer". Over time, a Simmer also manages to fly purely with the visual stimuli.

2) If everything is too hectic for you, reduce the simulation rate to 1/2, or 1/4, so you have more time to react. However, "slowing down time" also tempts you to pull harder on the controls. Always remember: minimal control movements!

3) In "difficult" mode, the exercise fails every time you make a mistake. For practice purposes, you can click "X" on the "Scenario Resolution - INCOMPLETE" message and still fly the flight to the end.

4) If you have problems maintaining the climb rate +/-200Ft/min:
The displays of the analog instrument do not match the real values.
The instrument has been implemented incorrectly:
- If the needle points horizontally to the left, this corresponds to 0Ft/min (which is correct).
- At 1000, 1500 and 2000Ft/min the needle is correctly on the respective markings of the scale.
- In the range between 0 and 1000Ft/min, the needle does not match the scale or the actual values.
You can clearly see on the scale that the lines are closer together in the 0-500Ft/min range than in the 500-1000Ft/min range.
The needle should therefore rise more slowly in this range (0-500) than in the rest of the scale, which can also be programmed without any problems.

That looks like 500Ft/min:
According to the "tool text" (at the bottom of the picture) only 430 Ft/min.

Vertical Speed Indicator (430 ft/min)

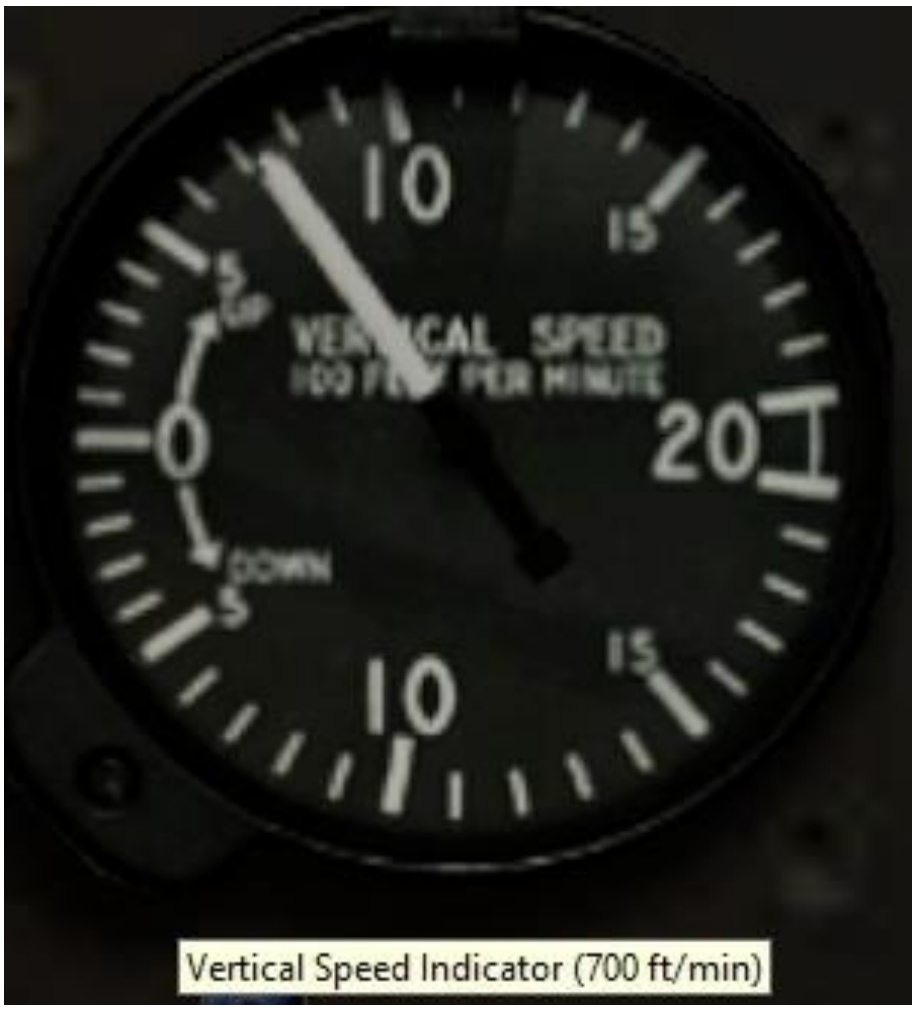
Exactly 500Ft/min looks like this:

Vertical Speed Indicator (500 ft/min)

300Ft/min:

Vertical Speed Indicator (300 ft/min)

700Ft/min:



Vertical Speed Indicator (700 ft/min)

A deviation of approx. 70Ft/min (at a climb/descent rate of 500Ft/min) does not play a role in normal flight operations, which is probably why the error was never corrected.
In the "helicopter school", however, more precise adherence to speed, altitude and climb rate is required than in normal flight operations.

That's why you will probably often fail because you supposedly climbed at less than 300Ft/min.
Unless you correct the incorrect display, i.e. always leave the display needle slightly above the regular 500Ft/min marker (slightly below the -500Ft/min marker when descending).

Green shows exactly 500Ft/min (+/-)
Red/orange shows the limits (300/700Ft/min)
As long as you stay within the red/orange lines, everything is fine.

I hope you enjoyed this flight, if so, please send feedback to p3d@andi20.ch . Please also send any error messages (spelling mistakes, incorrect information, etc.) to p3d@andi20.ch, I appreciate any feedback.