

Exercise 7 / Basic Autorotation

Aim: to teach how to enter and control the helicopter in autorotation at a given airspeed, RRPM and how to recover to the climb

Airmanship:

- Good Lookout (behind and below)
- Rotor RRPM 90% - 110% power off GOV ON
- Wind Direction – Velocity / ref smoke, water, cloud shadow, crops, given airfield direction
- HASEL:
- **HEIGHT** at least 1500ft AGL
- **AREA** clear of obstructions
- **SECURITY** no loose objects, hatches and harness
- **ENGINE** T&Ps Warning Lights, fuel, FULL CARB HEAT
- **LOOKOUT** Good look out around and below

GOV ON - Verbal warning “practice autorotation – Go”

For a good understanding of this exercise we recommend you read the principles of flight chapter on autorotation. In normal powered flight the engine is controlling engine revs and therefore rotor revs. This is maintained at 104% by the governor. In an auto rotation we are disengaging that drive by reducing the engine revs. We then use the up flowing air to maintain the blades turning and establish our autorotation. When we generally fly the R22 because the governor is controlling revs we don't tend to have much interest in that instrument. However during autorotation it is our control over the collective that controls the revs and we therefore pay a lot of attention to it.



Here you can see a standard R22 Revs gauge. In normal flight the governor controls the revs in the green area or arc. Above there is a red line at 110% and another at 90%. A low revs warning horn will come on at 97%. You control the revs with your collective. Lowering the collective reduces pitch therefore increasing the blades speed. Remember we are only operating at the bottom end of our collective controls with the lever low down. Also as there is no engine power there is a lag or delay between your actions and the reaction on the rotor revs.

Air exercise

Enter Auto	2000 ft AGL	Recover	500 ft+
Lower lever	Quickly	Open throttle	Out bound
Hold att	Cyclic back	Raise lever 22"	
Balance	Right pedal	Hold Att	Cyclic forward
Close throttle	70% engine	Balance	Left pedal
Lever up 1"	100% RRPM		
60 kts Att	Into wind		

Note ROD 1600 ft min and angle of descent, rotor RPM

CONTROL RRPM

1. raise lever - increase drag – RRPM decrease
2. lower lever – decrease drag – RRPM increase
Effects on Airspeed
 Increase airspeed - RRPM increase
 Decrease airspeed - RRPM decrease
3. Effects of disc loading on RRPM
 Off load - RRPM decrease
 Load (FLAIR) – RRPM increase
4. Turning 90° & 180°

Cyclic controls AOB & Att - Pedals control balance (in turn pedals) Lever controls RRPM 100%

Flare – Nose up RRPM ↑
 Nose Pitch down RRPM ↓
 Increase Air Speed RRPM ↑
 Decrease Air Speed RRPM ↓

**IMPORTANT TO REMEMBER EFFECT ON RRPM
 REDUCTION IN SPEED HAS A GREATER EFFECT THAN THE FLARE. IN FLIGHT ON EXTENDED AUTOS LEVER IS HIGH AND RRPM IS LOW INCREASING SPEED**

NOTES

