Static and Dynamic Rollover

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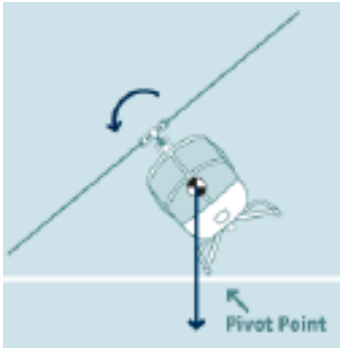
Static Rollover

- Static rollover occurs when the helicopter pivots about one skid/wheel in contact withthe ground to such an extent that the helicopter's Centre of Gravity (C of G) moves beyond the skid/wheel.
- Once the static rollover angle is exceeded removal of the original force causing the roll will not stop the helicopter rolling motion.
- This typically corresponds to a roll angle in excess of 30° for most helicopters.



Dynamic Rollover

- Some factor has to first cause the helicopter to roll or pivot around a skid, or landing gear wheel, until its critical rollover angle is reached (Helicopter is landing, hovering, taking off)
- Beyond this point, main rotor thrust continues
  the roll and recovery is impossible
- If the critical rollover angle is exceeded, the helicopter rolls on its side regardless of the cyclic corrections made.

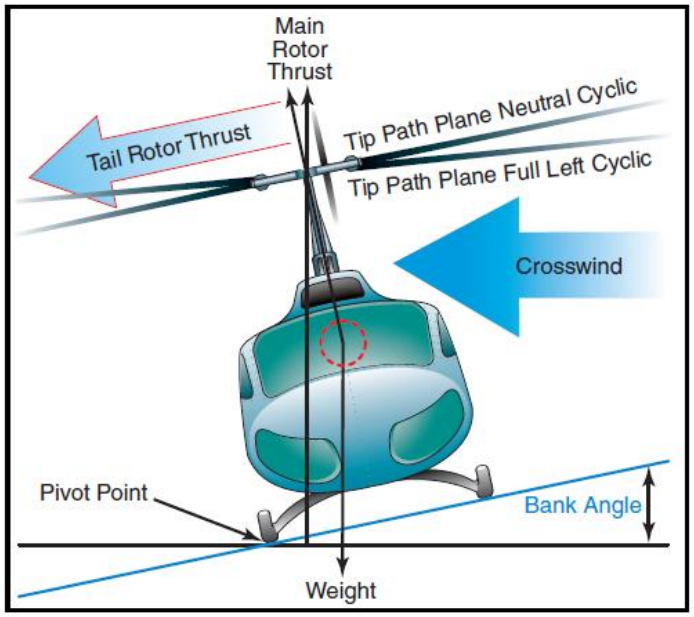
Critical Conditions

For helicopters with counter-clockwise rotor rotation:

- Right side skid/wheel down, since translating tendency adds to the rollover force.
- Right lateral center of gravity.
- Crosswinds from the left.
- Left yaw inputs.

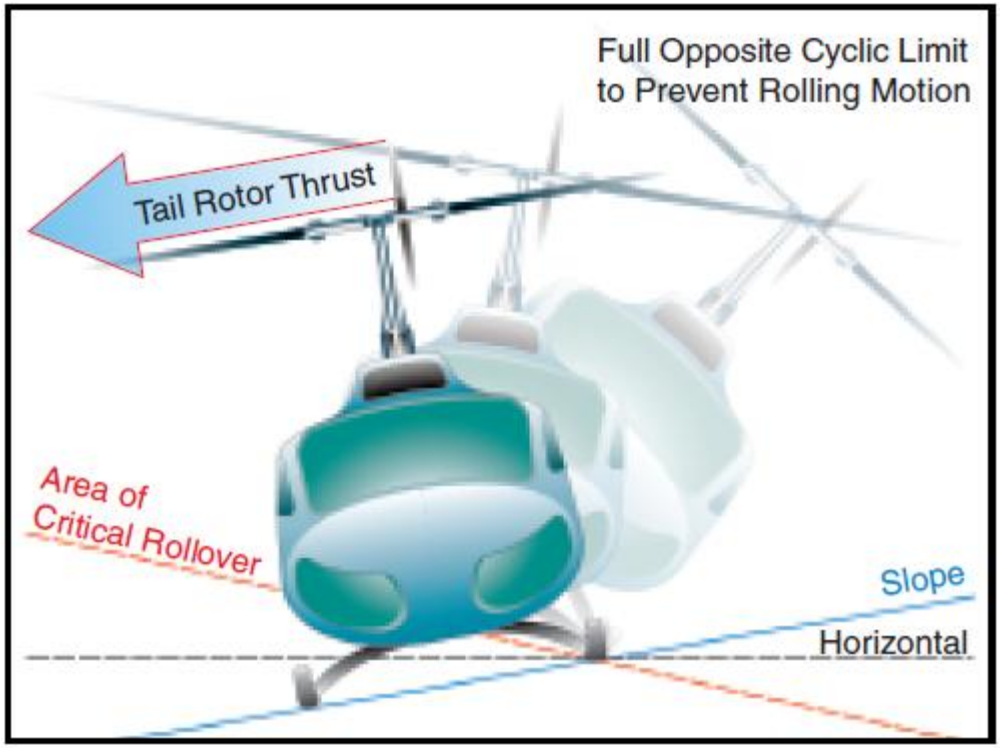
ALSO

- The rate of rolling
- High gross weights with thrust (lift) approximately equal to the weight.



- Dynamic rollover may also occur if you do not use the proper landing or takeoff technique or while performing slope operations
- The skid or wheel contacts a fixed object while hovering sideward, or if the gear is stuck in ice, soft asphalt, or mud.
- Quickly applying down collective is the most effective way to stop dynamic rollover from developing.

SLOPE TAKEOFFS AND LANDINGS



- Excessive application of cyclic control into the slope, together with excessive collective pitch control, can result in the downslope skid rising sufficiently to exceed lateral cyclic control limits, and an upslope rolling motion can occur.

- Keep the roll rates small.
- Slowly raise the downslope skid or wheel to bring the helicopter level, and then lift off.
- During landing, first touch down on the upslope skid or wheel, then slowly lower the downslope skid or wheel using combined movements of cyclic and collective.
- The collective is more effective in controlling the rolling motion than lateral cyclic, because it reduces the main rotor thrust (lift). A smooth, moderate collective reduction,
- at a rate less than approximately full up to full down in two seconds, is adequate to stop the rolling motion.

PRECAUTIONS

- Use a two-step liftoff. Pull in just enough collective pitch control to be light on the skids and feel for equilibrium, then gently lift the helicopter into the air.
- Hover high enough especially when practicing sideways or rearward flight.
- When the wind is coming from the upslope direction, less lateral cyclic control will be available.
- Tailwind conditions should be avoided when conducting slope operations.
- When the left skid/wheel is upslope, less lateral cyclic control is available due to the translating tendency of the tail rotor.
- If passengers or cargo are loaded or unloaded, the lateral cyclic requirement changes.

- Do not allow the cyclic limits to be reached. If the cyclic control limit is reached, further lowering of the collective may cause mast bumping. If this occurs, return to a hover and select a landing point with a lesser degree of slope.
- During a takeoff from a slope, if the upslope skid/wheel starts to leave the ground before the downslope skid/wheel, smoothly and gently lower the collective and check to see if the downslope skid/wheel is caught on something. Under these conditions vertical ascent is the only acceptable method of liftoff.
- During flight operations on a floating platform, if the platform is pitching/rolling while attempting to land or takeoff, the result could be dynamic rollover.