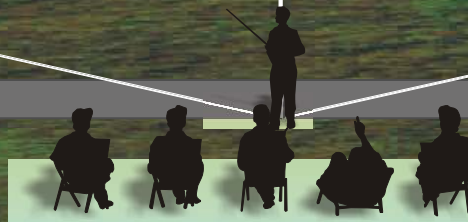
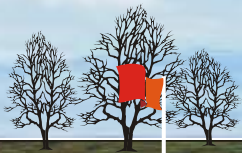


AMA Precision Aerobatics JUDGES TRAINING PRESENTATION

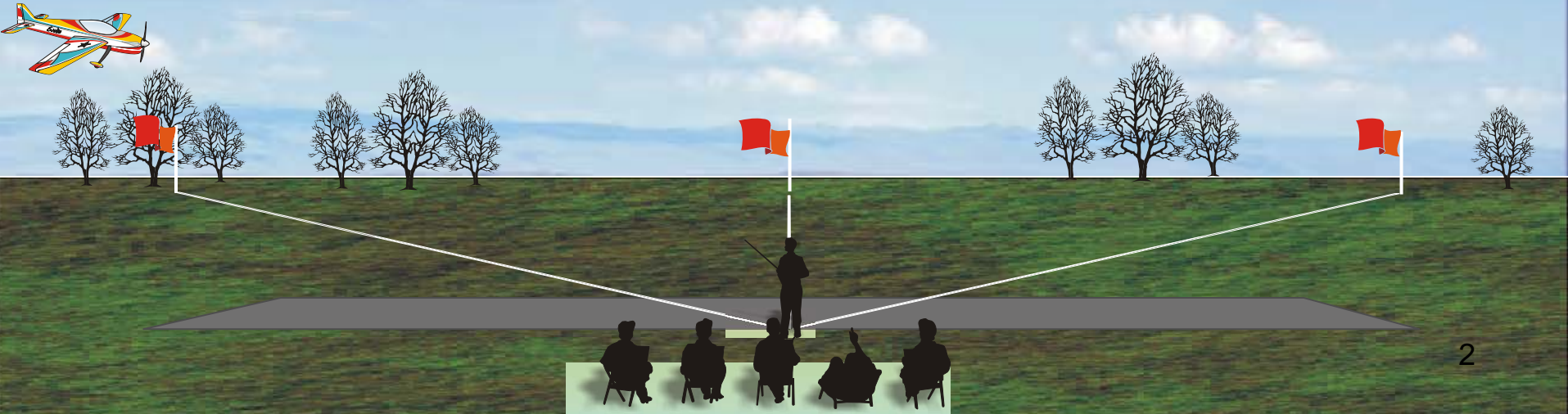
2007-2008





SCHEMATIC MANEUVER DIAGRAMS

AMA ADVANCED 403



403-1 – Takeoff

- ✎ It is not necessary for the model to stand still on the ground with the engine running without being held before the takeoff begins.
- ✎ It is also not necessary for the model to reach 2 meters in the same distance as the takeoff roll.
- ✎ The takeoff should not be downgraded for wing dips caused by air turbulence unless the wings are not immediately leveled.

Downgrades

- ✎ Model jumps from the ground.
- ✎ Retouches the ground after becoming airborne.
- ✎ Steep climb angle.
- ✎ Gallops in elevation during climb.
- ✎ Wings not level at any time.
- ✎ Model does not accelerate smoothly.
- ✎ Model passes behind the judges line, scored zero (0) points.

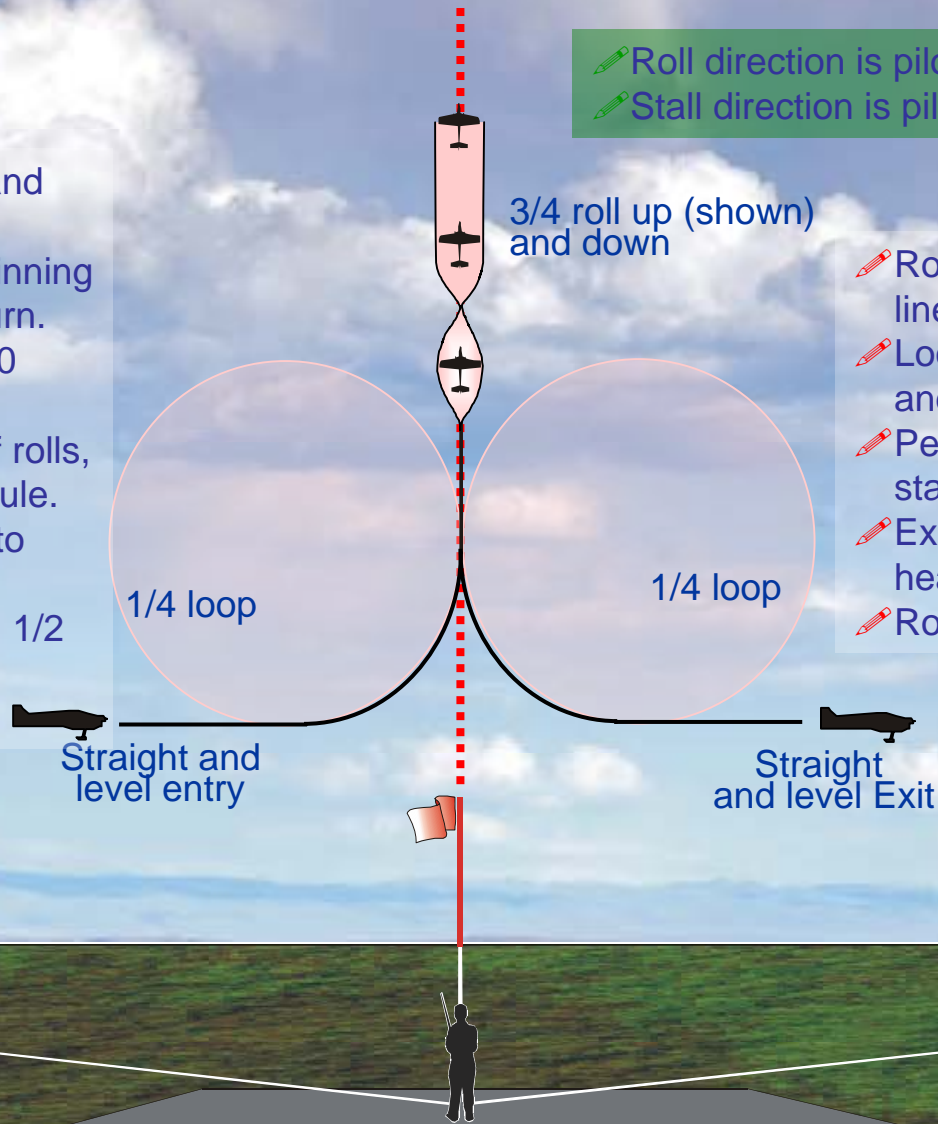
The lift off should be within two (2) meters of center for maximum points.

The maneuver is complete when the model is approximately two (2) meters (6-1/2 feet) from the ground..

403-2 - Stall turn, 3/4 roll Up and Down

- ✎ Roll direction is pilot's option
- ✎ Stall direction is pilot's option

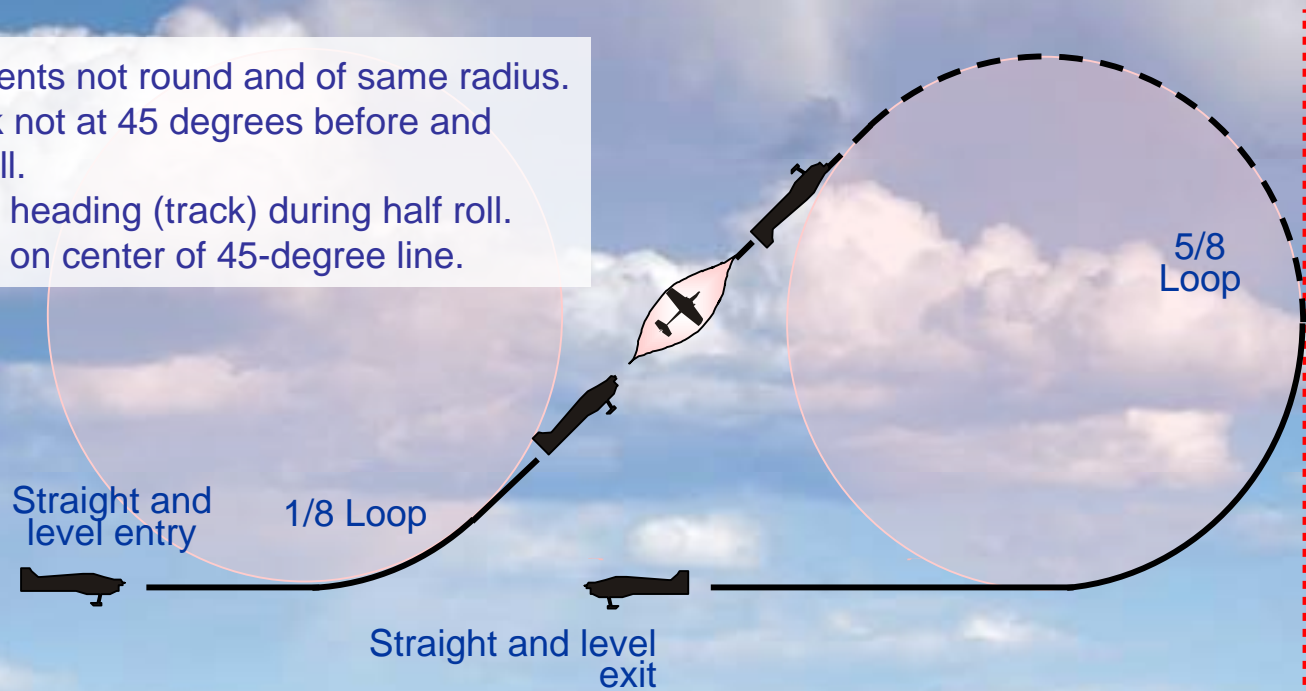
- ✎ Model not level at start and finish
- ✎ Track not vertical at beginning and end of rolls and stall turn.
- ✎ Track of stall turn not 180 degrees.
- ✎ Over or under rotation of rolls, one point per 15-Degree Rule.
- ✎ Return path not parallel to entry path.
- ✎ Pivot radius greater than 1/2 wingspan.



- ✎ Rolls not centered in vertical lines.
- ✎ Loop segments not round and of equal radius.
- ✎ Pendulum movement after stall.
- ✎ Exit not same altitude and heading (track) as entry.
- ✎ Roll rates not constant.

403-3 – Half Reverse Cuban 8

- Loop segments not round and of same radius.
- Model track not at 45 degrees before and after half roll.
- Changes in heading (track) during half roll.
- Half roll not on center of 45-degree line.



NOTE: In a TA maneuver, entry and exit altitude changes are allowed. To change altitude in this maneuver, the 45 degree line may be extended or truncated. All loop radii must remain equal.

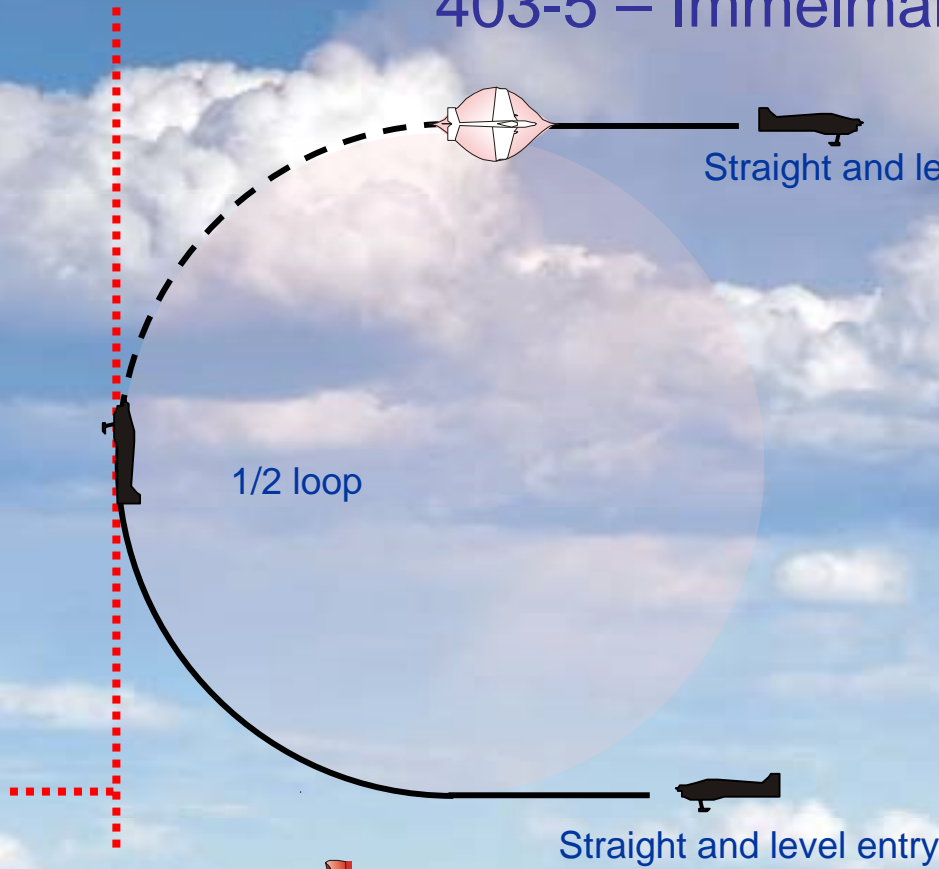


403-4 Slow Roll

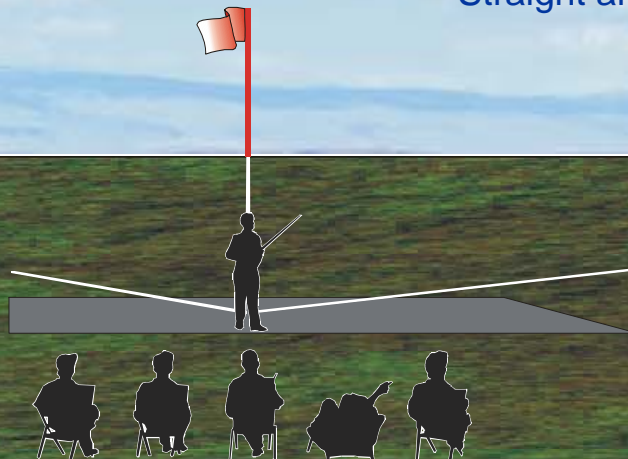
- ✎ Changes in heading (track).
- ✎ Changes in altitude.
- ✎ Roll rate not constant.
- ✎ Model does not roll exactly 360 degrees. (1 pt/15° rule)
- ✎ Duration of roll less than 3 seconds (+/- 300 feet for a model at 65 mph under 'reasonable' wind conditions)









403-5 – Immelman Turn

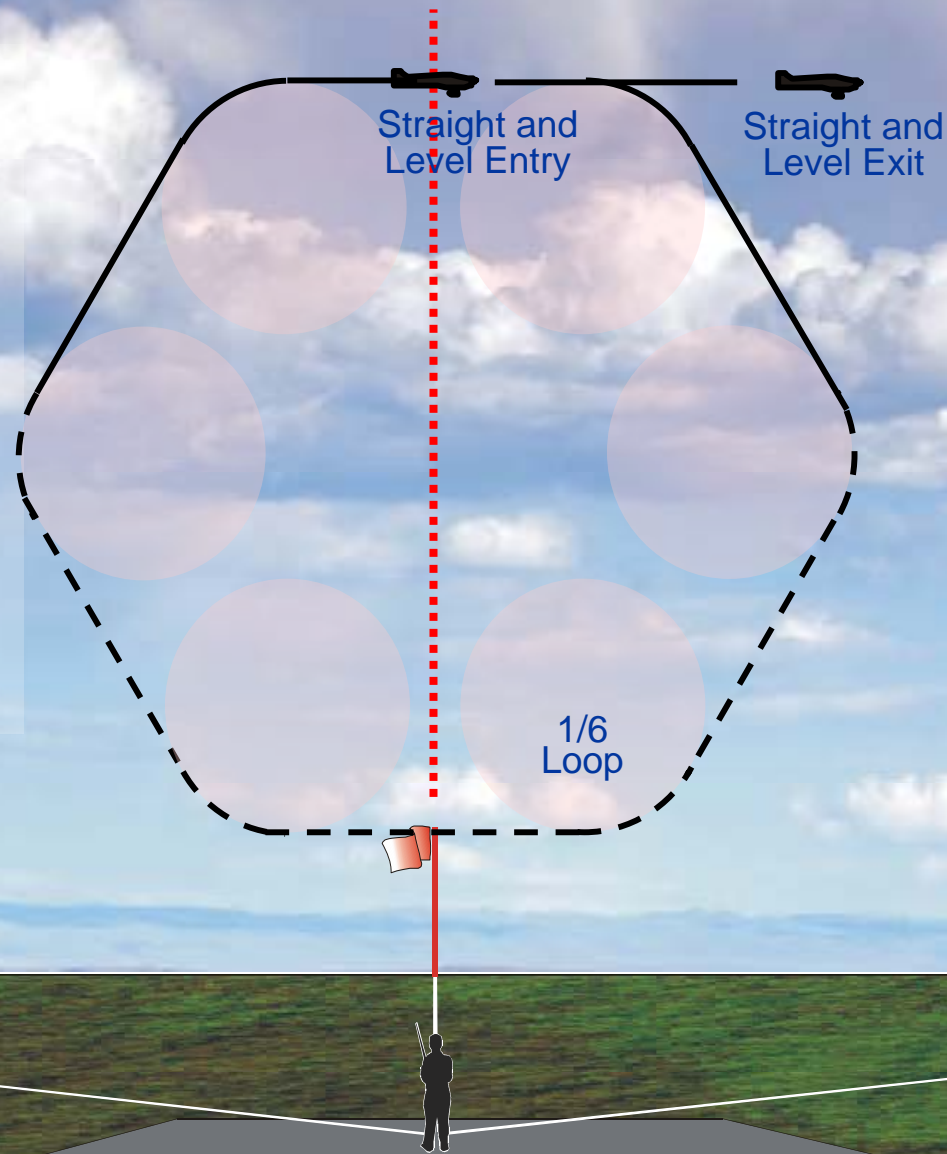


- ✎ Model not level at start or finish.
- ✎ Roll not immediately after half loop.
- ✎ Changes in heading (track) after half loop or prescribed roll.
- ✎ Model track does not finish exactly opposite direction of entry.
- ✎ Half loop not round.
- ✎ Over or under rotation on half roll, 1 pt/15° rule



403-6 – Six Sided Outside Loop from the Top

-  Loop segments not round
-  Loop segments do not have the same radius
-  Climbing and descending paths not 60 degrees
-  Model changes heading (track)
-  Model does not start and finish the loop at the same point
-  All six sides of the loop not same length.



403-7 – Bunt with Half Roll Out

Straight and level entry

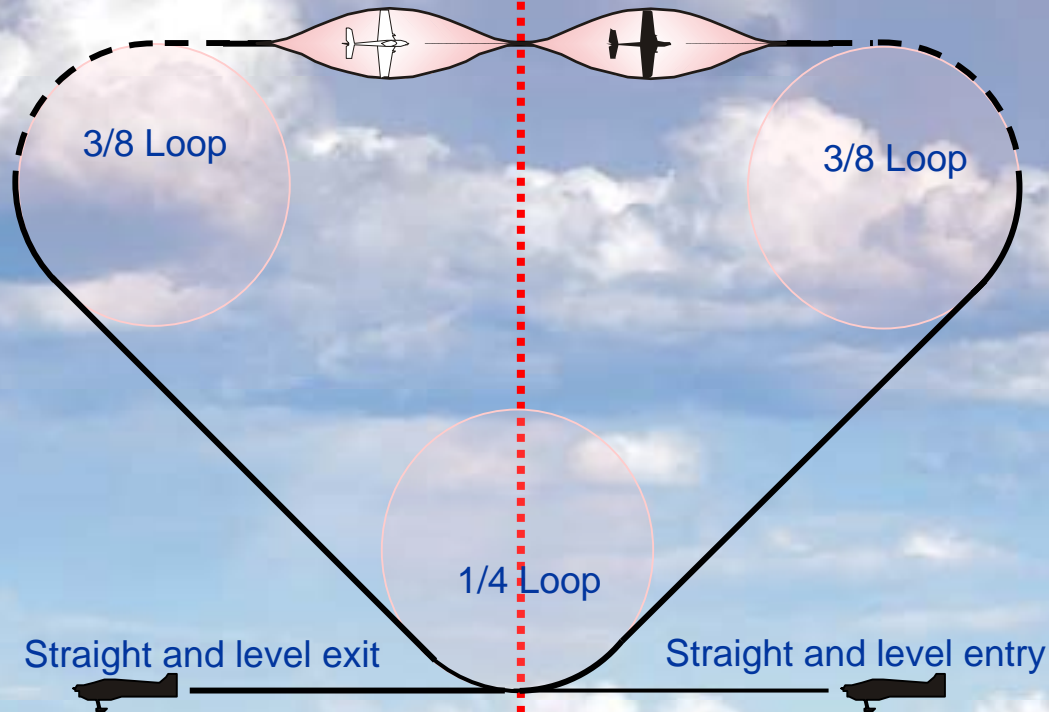
1/2 loop

Straight and level exit

- ✎ Model not level at start or finish.
- ✎ Half roll not executed immediately after half loop.
- ✎ Changes in heading (track) after half loop or half roll.
- ✎ Model heading (track) does not finish exactly opposite direction of entry.
- ✎ Half loop not round.
- ✎ Over or under rotation of half roll, 1 pt/15° rule.



403-8 – Triangle Rolling Loop

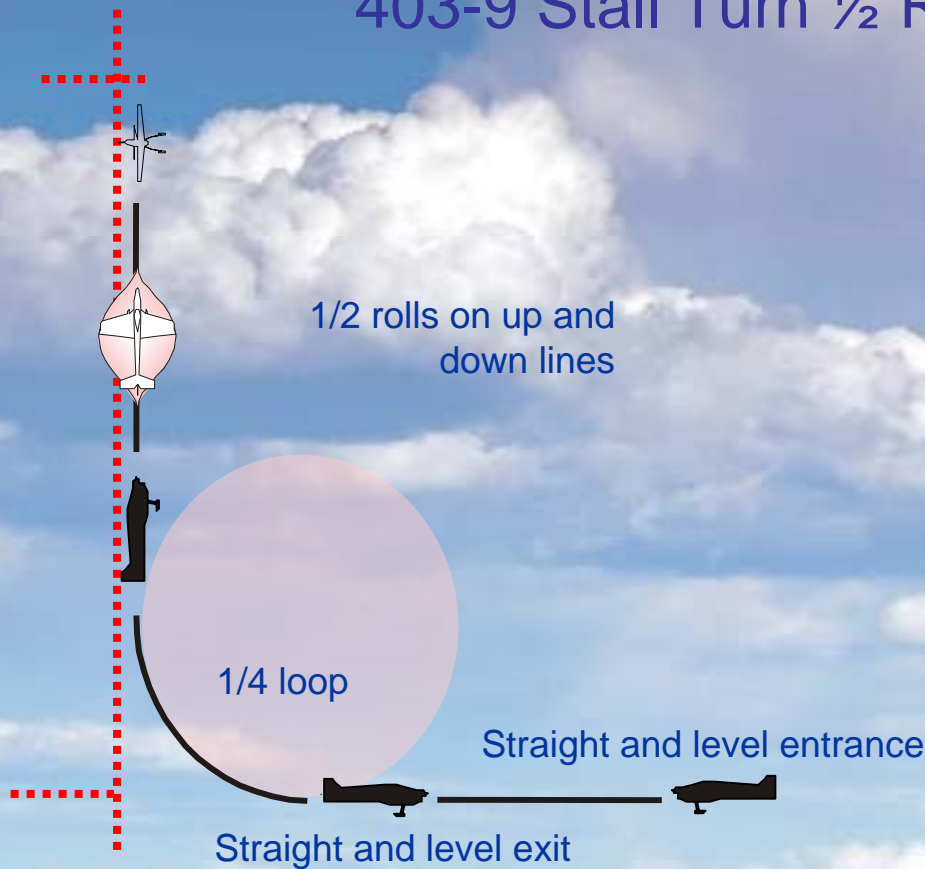


- Climbing and descending paths not 45 degrees.
- Climbing and descending paths not of equal length.
- Entry and exit not the same altitude
- Roll not in center of line

- Roll not 360 degrees, 1 pt/15° rule
- Model changes heading (track) during loops and rolls
- Maneuver does not start and finish at same point.
- Loop segments not round and of equal radius.

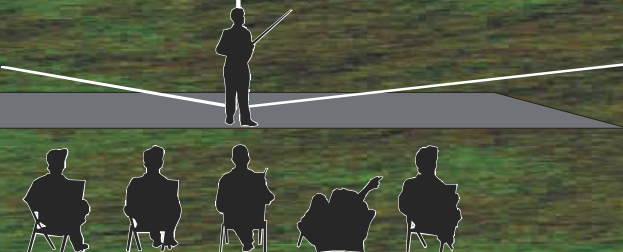


403-9 Stall Turn ½ Rolls Up & Down

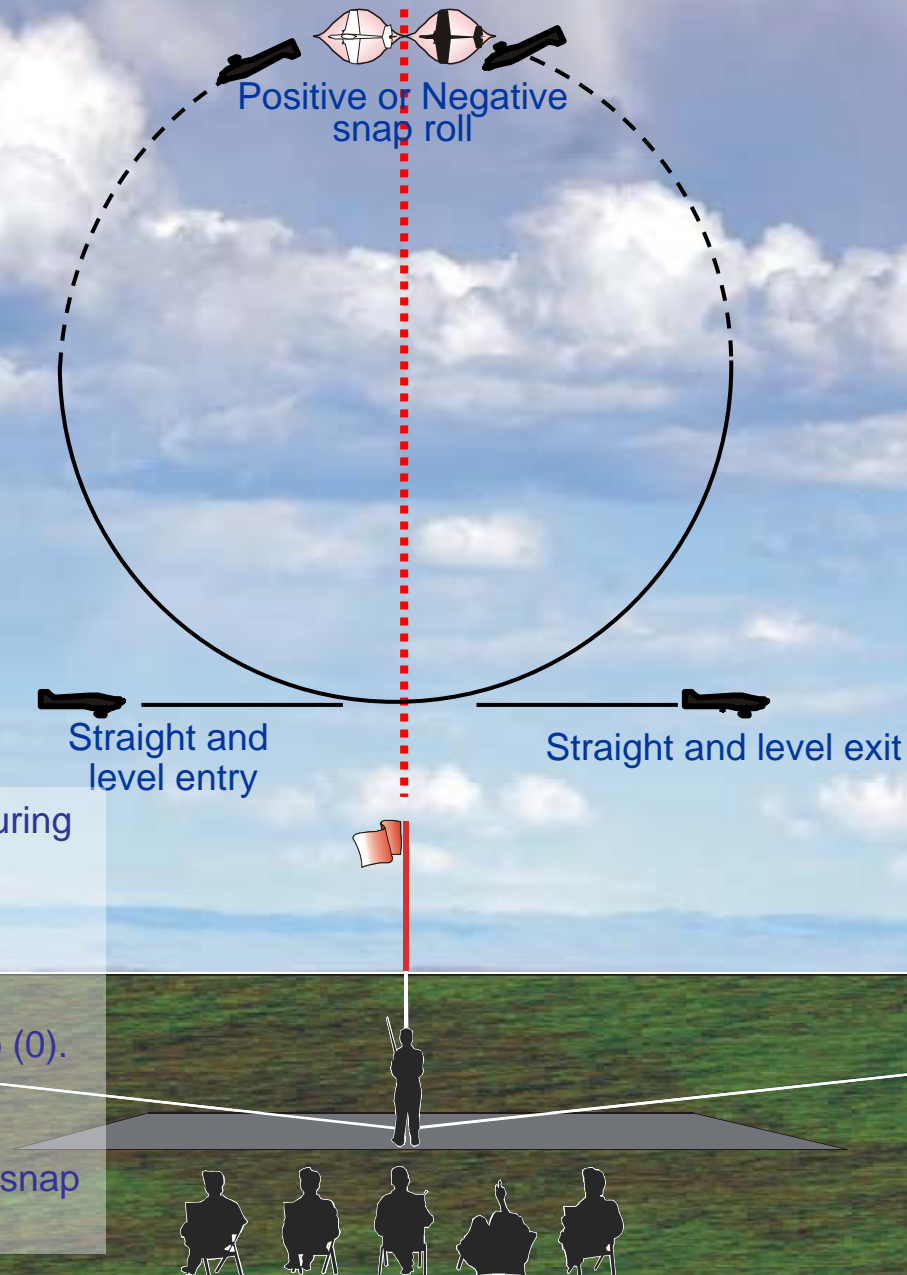


- ✎ Model not level at start and finish.
- ✎ Track does not become exactly vertical.
- ✎ Model track not vertical at start and finish of rolls and stall turn.
- ✎ Return path not parallel to entry path.
- ✎ Pivot radius greater than 1/2 wingspan.
- ✎ Pendulum movement after stall.
- ✎ Rolls not 1/2 roll, 1 pt/15° rule.
- ✎ Roll rates not equal
- ✎ Rolling elements not centered in their respective lines
- ✎ Loop segments not round with same size and radius.

✎ Entry and exit altitudes may be different



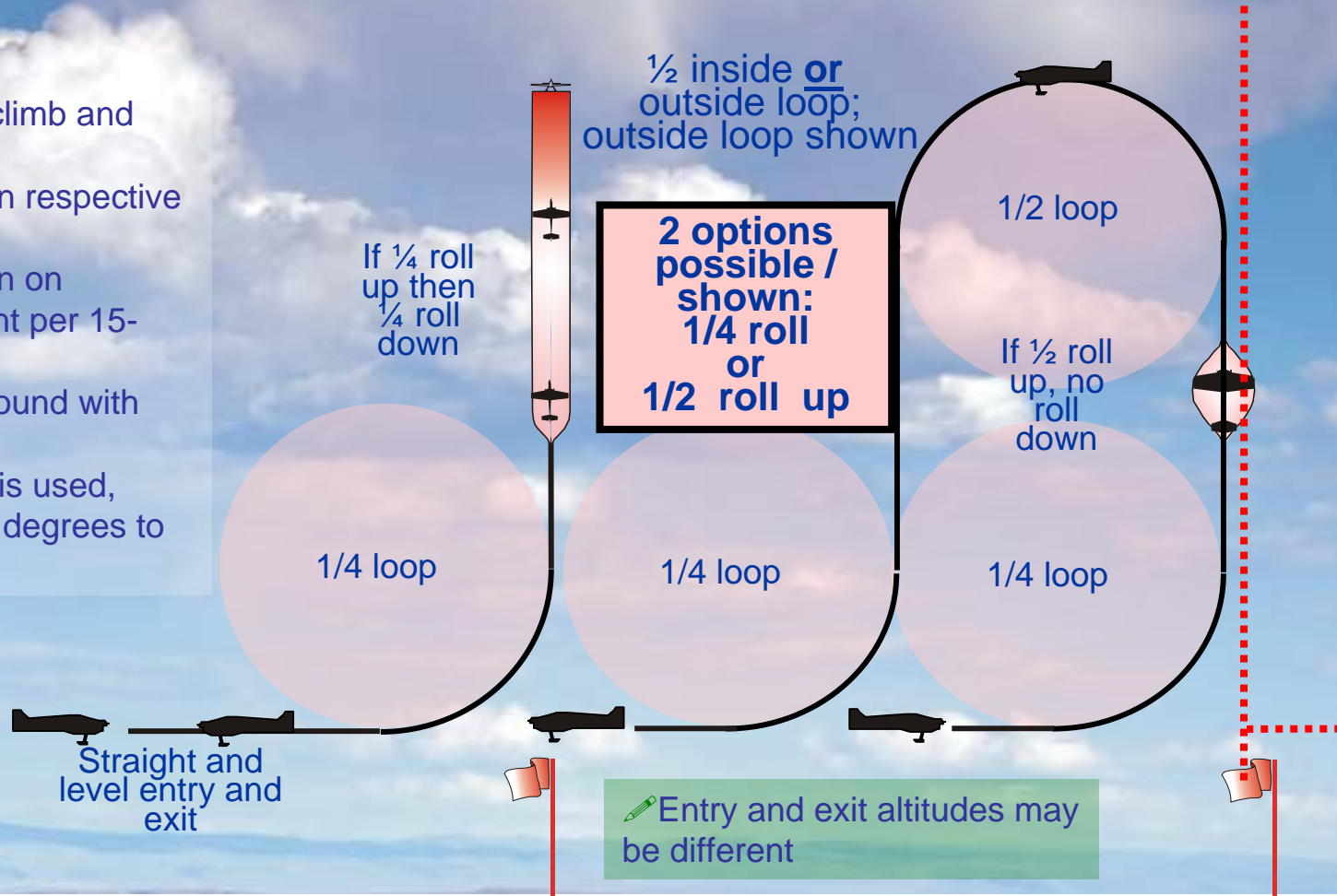
403-10 – Avalanche



- ✎ Changes in heading (track) during loop.
- ✎ Loop not constant radius
- ✎ Wings not level during loop.
- ✎ Snap roll not 360 degrees.
- ✎ Roll not snap roll scores zero (0).
- ✎ Entry and exit not the same altitude
- ✎ Over or under rotation of the snap roll, 1 pt/15° rule.

403-11 – Humpty Bump With Options

- ✎ Track not vertical in climb and dive.
- ✎ Roll(s) not centered in respective vertical lines.
- ✎ Over or under rotation on prescribed roll, one point per 15-Degree rule.
- ✎ Loop segments not round with same size and radius.
- ✎ If optional 1/4 roll up is used, track of 1/2 loop not 90 degrees to the flightline.



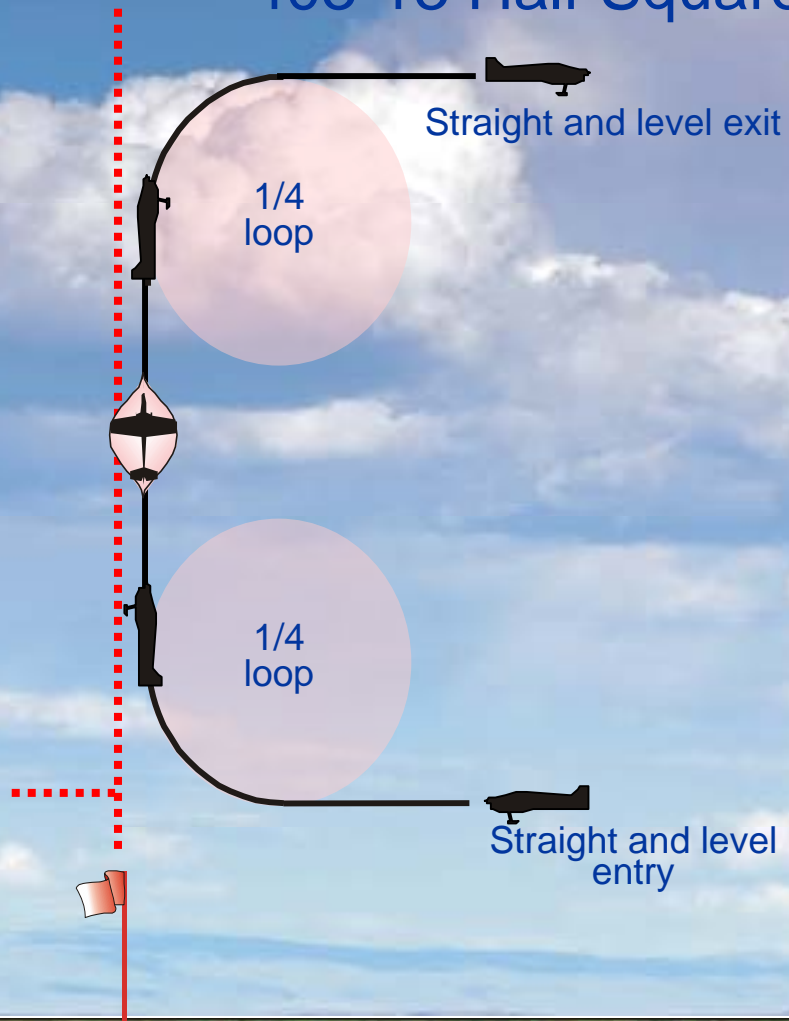
403-12 – Four Point Roll

- ✎ One-quarter rolls more or less than 90 degrees - 1 pt/15° rule
- ✎ Model does not hesitate after each quarter roll
- ✎ Hesitations not of equal duration
- ✎ Roll rate not constant
- ✎ Changes in altitude
- ✎ Changes in heading (track)

✎ Center is middle of inverted flight.



403-13 Half Square Loop, Half Roll Up



- ✎ Corner loop segments not of equal radius.
- ✎ Model track not vertical before and after prescribed roll.
- ✎ Half roll not on middle of vertical line
- ✎ Over/under rotation of roll, 1 pt/15° rule
- ✎ Changes in heading (track) in loop segments or during roll.
- ✎ Roll rate not constant.
- ✎ Up line track not vertical.

403-14 – 45 Deg Down 1 Positive Snap

Straight and level entry

1/8 loop

45° path

1/8 loop

Straight and level exit

- ✎ Loop segments not round and of equal size / radius.
- ✎ Diving path (track) not 45 degrees.
- ✎ Track changes during 45 degree line.
- ✎ Snap Roll not centered in diving path
- ✎ Snap not a positive snap scores zero (0).
- ✎ Snap roll not exactly 1 positive snap (360 degrees), 1 pt/15° rule.
- ✎ Changes in heading (track) during loops or snap.



403-15 Top Hat with 1/4 Rolls

- ✎ Model not vertical at start and finish of 1/4 rolls
- ✎ Over or under rotation on 1/4 roll, 1 pt/15° rule
- ✎ Model does not fly across top straight and level inverted and 90 degrees to the flightline.
- ✎ 1/4 rolls on up and down lines rolls not centered on line segments.
- ✎ Roll rates not constant.
- ✎ Loop segments not round and of equal radius.

1/4 roll up
Inverted across top
1/4 roll down

1/4 loop

Straight and level entry and exit

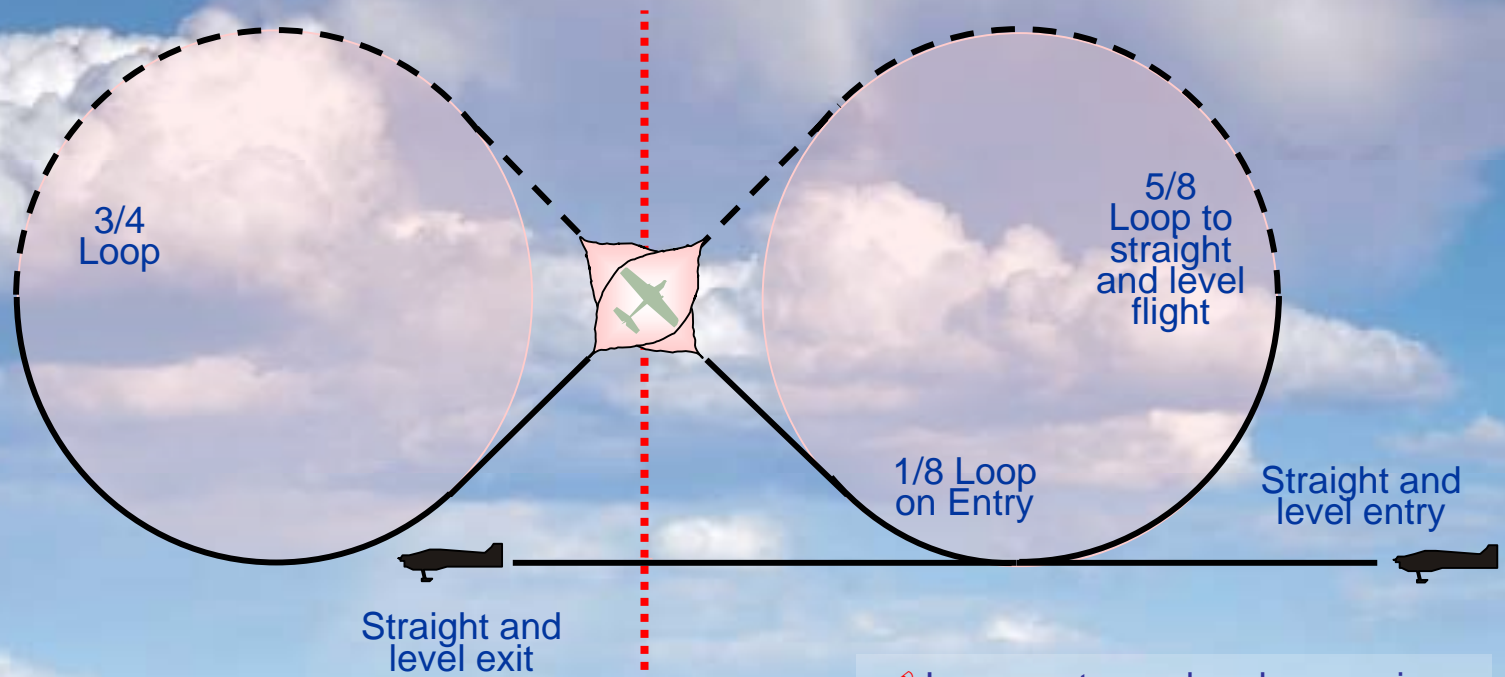
1/4 loops at top same radius as entry/ exit






✎ Note: all 3 line segments may be different lengths

✎ Entry and exit altitudes may be different

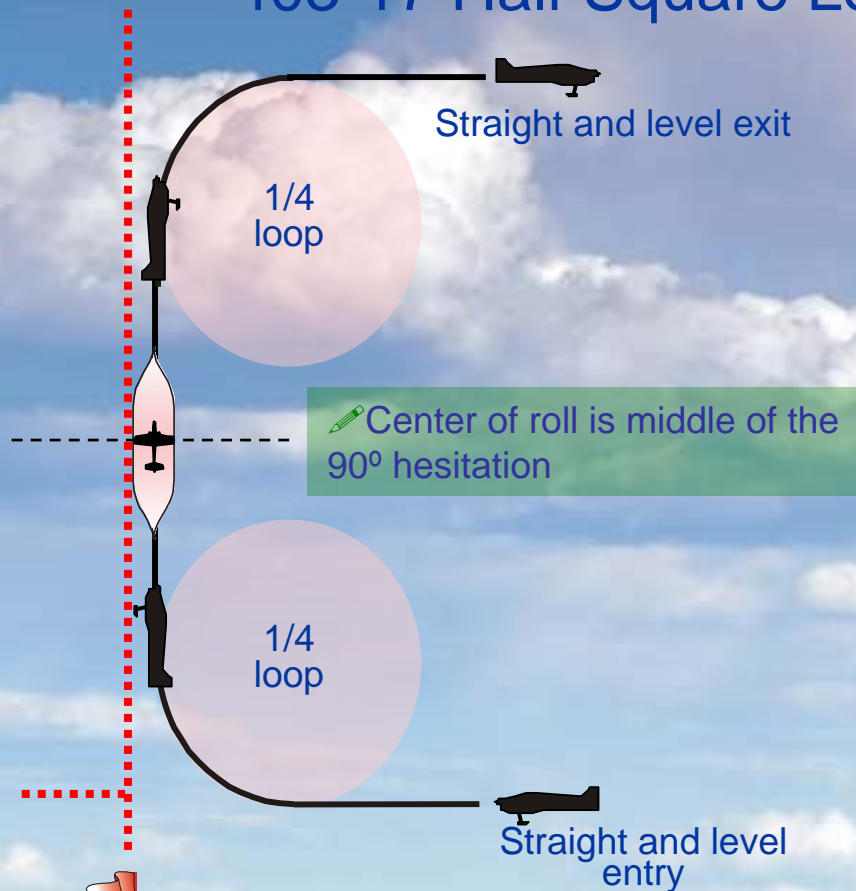









403-16 – Reverse Cuban 8 with Half Rolls



-  Loops not round and same size
-  Track of Model not at 45 degrees at start and finish of rolls.
-  Changes in heading (track) during loops and rolls.
-  Under or over rotation of roll elements, 1 pt/15° rule
-  1/2 rolls not centered in the 45 degree lines and on each other.

403-17 Half Square Loop, 2/4 Pt Roll Up

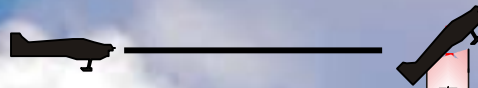


-  Corner loop segments not of equal radius.
-  Model does not execute 2 of 4 pt roll, zero (0)
-  Model track not vertical before and after 2/4 pt roll.
-  2 of 4 pt roll not on middle of vertical line
-  Changes in heading (track) in loop segments or during roll.
-  Roll rate not constant.
-  Up line track not vertical.



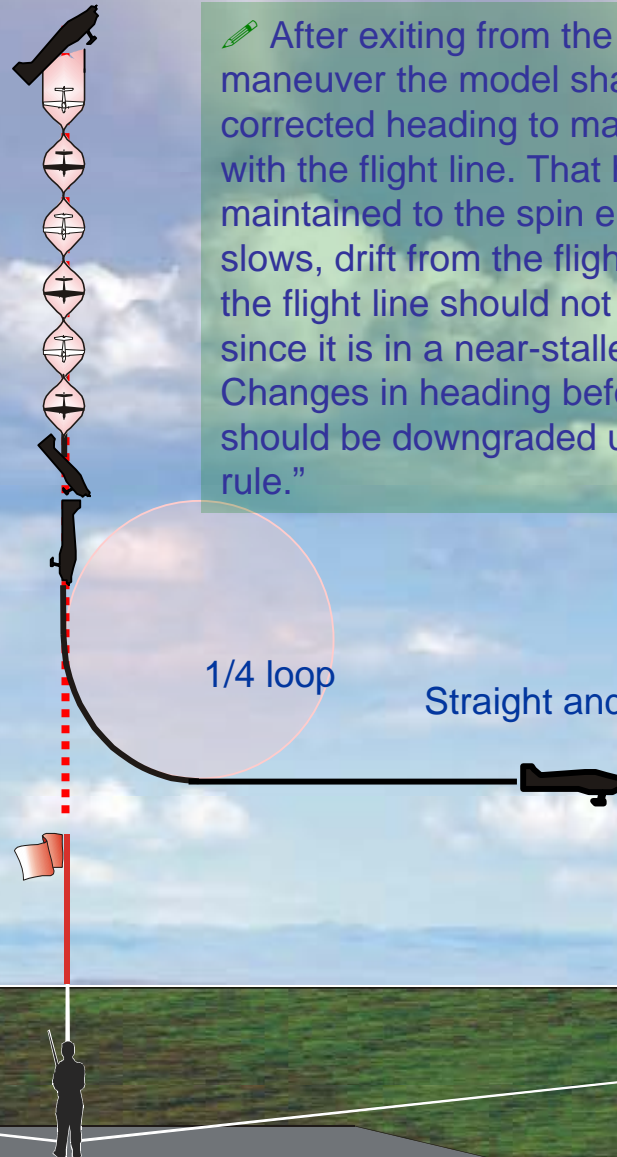
403 -18 – 3 -Turn Spin

Straight and level entry



- ✎ Snap roll or unstalled entry - **0 pts**
- ✎ Model climbs or dives during entry or exit, 1 pt/15° rule. (Entry ends with the stall)
- ✎ Model climbs or dives during entry or exit, 1 pt/15° rule. (Exit begins at completion of one-quarter (1/4) loop recovery to level flight)
- ✎ Wings not level during entry or exit.
- ✎ Wings not perpendicular to flightline at end of required number of turns, 1 pt/15° rule.
- ✎ Spiral dive or pure rotation around roll axis of more than one-half (1/2) turn - **0 pts**
- ✎ Tail of model does not describe a cone during rotation - **0 pts**
- ✎ Wing passes through vertical plane before nose passes through horizontal plane (snap roll entry) – **0 pts**
- ✎ Fuselage reaches a vertical attitude before rotation begins (simulation of stall by application of elevator) - **0 pts**

✎ After exiting from the preceding maneuver the model shall establish a wind corrected heading to maintain track parallel with the flight line. That heading should be maintained to the spin entry. As the model slows, drift from the flight path parallel with the flight line should not be downgraded since it is in a near-stalled condition. Changes in heading before spin entry should be downgraded using the 1 pt/15° rule.”



1/4 loop

Straight and level exit



403-19 – Landing

The landing will not be downgraded if:

- ✎ The model rolls to a controlled stop within 10 meters.
- ✎ Wing dips which are caused by air turbulence unless they are not immediately corrected.
- ✎ The pilot “slips to a landing” to handle a crosswind condition in which case a wing will be low
- ✎ Displacement of the touchdown point left or right as long as the landing is in the landing zone

Landing begins when the model is approximately two (2) meters (6-1/2 feet) from the ground.

Landing zone (white) and Landing area (green) shown below.

- ✎ Model passes behind the judges line, zero (0) points.
- ✎ Model impacts the runway due to lack of flare.
- ✎ Model bounces.
- ✎ Changes in track.
- ✎ Model ends on its back, zero (0) points.
- ✎ Model lands outside landing zone (but still on runway).
- ✎ If any undercarriage retracts before the landing is complete, zero (0) points.
- ✎ Aircraft “porpoises” and/or wanders during approach or flare.
- ✎ Aircraft lands outside the landing area or runway, zero (0) points.
- ✎ Aircraft touches down while not straight to runway and ground track.

✎ Landing zone is 30 m long centered on the judges BUT not more than 30 M wide.

Landing area:
the entire
defined runway

