Advanced (403)

Maneuver Descriptions

And

Suggested Downgrades

2015

Purpose: The purpose of this guide is to furnish an accurate description of each maneuver of the Advanced (403) pattern sequence. Study of this guide by the competitor will help him learn exactly what is expected, while study by the judges will help them decide precisely how well the competitor meets these expectations. The competitor or judge should refer to the AMA Judge's Guide for general information regarding downgrades such as the "One Point per 15 degree Rule". All maneuvers must have a level entry and exit.

Also note that the following general statements apply.
- Turnaround maneuvers are never required to exit at the same altitude as the entry
- Turnaround maneuvers are always required to be exited on a track that is a reciprocal heading (180 degrees) to the entry track.
- Center maneuvers will always exit at the same track as the entry track
- Unless specifically stated otherwise, all maneuver geometry is to be judged by track
- The only portions of maneuvers where track does not apply are the entries to the stall turn and the spin.
- Although the 15 degree rule applies universally, judges are expected to be more critical of horizontal and vertical tracks than those at off angles, such as 45 degree lines.
- Start of the takeoff, landing and box entry must be called out by the competitor or his caller to avoid downgrades. There is no downgrade for not calling takeoff and landing completions or box exit.

Sequence: Below is the listed sequence for Advanced. U, D, and T represent Upwind, Downwind and Turnaround, respectively.

Advanced Sequence

Maneuver	KF
1. Takeoff Sequence (U)	1
2. Double Immelmann with full rolls (U)	3
3. Humpty Bump with options (1⁄2 roll up or 1⁄4 rolls up & down) (T)	2
4. Slow Roll (D)	3
5. Shark's tooth, half roll on vertical, half rolls reversed on 45 down (T)	3
6. Avalanche with full snap (positive/negative (U)	3
7. Stall Turn, full roll up (T)	2
8. Square Loop on corner, ½ roll in first leg, exit inverted (D)	4
9. Figure 9 from bottom (T)	1
10. Hourglass, top first, ½ roll on down line, exit inverted (U)	4
11. Stall turn, ½ roll down (T)	2
12. Four Point Roll (D)	4
13. Top Hat, ¾ roll up, ¼ roll down, exit inverted (T)	2
14. Cobra roll, ½ roll up, positive snap down (U)	4
15. Half Square Loop, 2/4 roll up (T)	2
16. Triangle Loop, base on top, ½ rolls in 45 degree legs (D)	4
17. Half Reverse Cuban from top, ½ roll on 45 (T)	2
18. Three Turn Spin (U)	3
19. Landing Sequence (U)	1

TOTAL K-Factor   **50**

Maneuver Descriptions:

1. **Takeoff Sequence (U):** The takeoff maneuver will be scored in half point increments from 10 to 0. The model is smoothly accelerated to takeoff speed. When flying speed is reached it gently lifts off the ground and climbs at a gradual angle. The lift off should be within one meter of center for maximum points. (Measured as one meter each side of center) The aircraft must not deviate in track during takeoff but will change heading after liftoff to maintain a straight track with the takeoff roll. The maneuver is complete when the model is approximately 2 meters (6-1/2 feet) from the ground.

    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.
    - Lift off is not within one meter each side of center.
    - Model retouches the ground after becoming airborne.
    - Steep climb angle.
    - Model gallops in elevation during climb.
    - Track not maintained through completion of maneuver.
    - Wings not level at any time.
    - Throttle not smoothly accelerated.
    - Model passes behind the judge's line, scored zero (0) points.
    - Failure to call start of maneuver.

2. **Double Immelmann with Full rolls (U):** From upright, pull through a 1⁄2 inside loop, then immediately perform a full roll to level inverted flight, hesitate, then pull into a 1⁄2 inside loop to return to the entry altitude, immediately perform a full roll to exit upright. The horizontal legs must be equal to the diameter of the half loops, thus forming a square.

    Downgrades:

    - Half loops not round with constant and equal radius.
    - Half loops not completed exactly above or below point of commencement of half loops.
    - Horizontal legs not equal to diameter of half loops.
    - Rolls not executed immediately after completion of half loops.
    - Roll rates not constant and equal.
    - Changes in track during half loop, rolls
    - Entry and exit not at same altitude or not level.
    - Under or over rotation of prescribed roll elements. Apply "One Point per 15 Degree Rule".

- Line segments including rolls not straight, horizontal and on track.
- Failure to call box entry.

3. **Humpty Bump w/Roll Options (half roll up or 1/4 roll up and down) (T)**: From upright pull a ¼ inside loop to a vertical up line, hesitate, perform a ½ roll, or optionally a ¼ roll on this up line, hesitate, pull or optionally push through a ½ loop to a vertical down line, hesitate, perform a ¼ roll if a ¼ roll was used on the upline, hesitate, pull a ¼ inside loop to exit upright.
Downgrades:

- Track not vertical in up line and down line.
- Rolls not centered in respective vertical lines.
- Over or under rotation on roll elements. Apply "One Point per 15 Degree Rule".
- Loop segments not round with same size and radius.
- If optional cross box roll is used (1/4 roll), (1/2) loop not 90 degrees to the flight line.

4. **Slow Roll (D)**: From upright, perform a full roll of at least 3 seconds, exit upright. Center is middle of inverted flight.

   Downgrades:

- Changes in track
- Changes in altitude.
- Roll rate not constant.
- Model does not roll exactly 360 degrees. Apply "One Point per 15 Degree Rule".
- Duration of roll less than 3 seconds.

5. **Shark's tooth, half roll on vertical up line, two half rolls reversed on 45 down (T)**: From upright, pull a 1/4 inside loop to a vertical up line, hesitate, perform a half roll, hesitate, push to a 45 degree downline, hesitate, perform a half roll, hesitate, perform a half roll in the opposite direction, hesitate, pull a 1/8 inside loop to exit upright. The hesitation between the half rolls on the 45 downline is not required.

   Downgrades:

- Loop segments not round or of equal radius.
- Upline track not vertical.
- Prescribed rolls not centered on middle of their respective lines.
- Over or under rotation of prescribed roll. Apply "One Point per 15 Degree Rule".
- Changes in track in loop segments or during prescribed roll.
- Roll rates not constant.

6. **Avalanche with Full snap pos/neg (U)**: From upright, pull an inside loop with a positive or negative snap roll centered on the apex of the loop and exit upright

   Downgrades:
   - Loop not round.
   - Over or under rotation of snap roll. Apply "One Point per 15 Degree Rule".
   - Snap roll not centered on apex of loop.
   - Changes in track during loop or snap.
   - Snap roll not a snap (**0 points**) - See rulebook.

7. **Stall Turn, full roll up (T):** From upright, pull a 1/4 inside loop to a vertical upline, hesitate, perform a full roll, hesitate, and perform a stall turn through 180 degrees, hesitate, execute a 1/4 inside loop to exit upright.

   Downgrades:

   - Upline and downline tracks are not vertical.
   - Model heading not vertical at start and finish of stall turn.
   - Return path not parallel to entry path.
   - Pivot radius greater than 1/2 wingspan.
   - Pendulum movement after stall.
   - Loop segments not round with same size and radius.
   - Roll element not centered.
   - Under or over rotation of prescribed roll elements. Apply "One Point per 15 Degree Rule".

8. **Square loop on corner, 1/2 roll in first leg (D), exit inverted:** From upright, pull a 1/8 inside loop to a 45 degree upline, hesitate, performs a ½ roll, hesitate, push a ¼ outside loop to a 45 degree upline, hesitate, push a ¼ outside loop to a 45 degree downline, hesitate, push a ¼ outside loop to a 45 degree downline, hesitate, push a 1/8 outside loop to exit inverted. The overall length of the first line containing the half roll shall be the same length as the other three.

   Downgrades:

   - Any side not at 45 degrees to horizon.
   - Loop not square with sides of equal length.
   - Loop segments not round and of equal radius.
   - Wings not level during one-quarter loops.
   - Changes in track during loops.
   - Roll element not centered on line.
   - Roll rate not constant.

- Under or over rotation of prescribed roll elements. Apply "One Point per 15 Degree Rule".

9. **Figure 9 (T):** From inverted, push a ¼ outside loop to a vertical upline, hesitate, pull a ¾ loop to exit upright at a mid-box altitude.

   Downgrades:

   - Track does not become exactly vertical.
   - Loop segments not round and of equal size and radius.
   - Wings not level during loop segments.
   - Changes in track during loop segments.

10. **Hourglass (middle entry, top first), 1/2 roll down, exit inverted (U):** From upright, pull a 1/8 inside loop to a 45 degree upline, hesitate, pull a 3/8 inside loop to level inverted flight, hesitate, pull a 3/8 inside loop to a 45 degree downline, hesitate, performs a 1/2 roll, hesitate, pull a 3/8 inside loop to level upright flight, hesitate, pull a 3/8 inside loop to a 45 degree upline, hesitate, pull a 1/8 inside loop to exit inverted.

    Downgrades:

    - Climbing and diving paths not 45 degrees. Apply "One Point per 15 Degree Rule".
    - Loop segments not round and of equal size and radius.
    - Wings not level during loop segments.
    - Changes in track during loop segments or prescribed roll element.
    - Roll not centered on line and in center of box.
    - Over or under rotation of prescribed rolls. Apply "One Point per 15 Degree Rule".
    - Roll rate not constant.
    - Exit altitude different then entry altitude

11. **Stall turn, 1/2 roll down (T):** From inverted, push a ¼ inside loop to a vertical upline, hesitate, perform a stall turn through 180 degrees to a vertical downline, hesitate, perform ½ roll, hesitate, pull a ¼ inside loop to exit upright.

    Downgrades:

    - Track is not exactly vertical.
    - Loop segments not round and of equal size and radius.
    - Wings not level during loop segments.
    - Changes in track during loop segments or prescribed roll elements.
    - Prescribed Roll not centered on lines.

    - Over or under rotation of prescribed rolls. Apply "One Point per 15 Degree Rule".

- Roll rate not constant.
- Pivot radius greater than half wingspan.
- Pendulum movement after stall.

12. **Four Point Roll (D):** From upright, perform 4 consecutive ¼ rolls, hesitating at each 90 degree point, exiting upright. Center is middle of inverted flight.

    Downgrades:

    - Hesitations are not at 90,180,270,360. Apply "One Point per 15 Degree Rule" to each.
    - Model does not hesitate after each one-quarter roll.
    - Hesitations not of equal duration
    - Roll rate not constant.
    - Changes in altitude.
    - Changes in track.

13. **Top Hat, 3/4 roll up, 1/4 roll down, inverted exit (T):** From upright, pull a ¼ inside loop to a vertical upline, hesitate, perform a ¾ roll left or right, hesitate, pull a ¼ inside loop to inverted, hesitate, pull a ¼ inside loop, hesitate, perform a ¼ roll left or right, hesitate, push through a ¼ outside loop to exit inverted.

    Downgrades:

    - Model not vertical at start and finish of roll elements.
    - Rolls not exactly 90 or 270 degrees.
    - Model does not fly straight and level inverted and at 90 degrees to the flight line.
    - Rolls not centered on line segments.
    - Loop segments not round with same size and radius.
    - Model not inverted on top line **(0 pts).**

14. **Cobra roll, 1/2 roll up, positive snap down (U):** From inverted, push a 1/8 outside loop to a 45 degree upline, hesitate, perform a ½ roll, hesitate, push a ¼ outside loop to a 45 degree downline, hesitate, perform a positive snap roll, hesitate, pull a 1/8 inside loop to exit upright.

    Downgrades:

    - Loop segments not round with same size and radius.
    - Climbing and diving paths not 45 degrees. Apply "One Point per 15 Degree Rule".
    - Model changes track.
    - Half roll not exactly 180 degrees of roll. Apply "One Point per 15 Degree Rule".
    - Roll elements not centered on 45 degree lines.
    - Entry and exit not at same altitude.
    - Over or under rotation of the snap roll. Apply "One Point per 15 Degree Rule".
    - Snap not a positive snap scores zero (0).

15. **Half Square Loop with 2/4 roll up (T):** From upright, pull a ¼ inside loop to a vertical upline, hesitate, perform a 2/4 roll, hesitate, push a ¼ outside loop to exit upright at a higher altitude.

   Downgrades:

   - Corner loop segments not of equal radius.
   - Model upline track not vertical before and after prescribed roll.
   - Prescribed roll not on middle of vertical line.
   - Over or under rotation of roll element. Apply "One Point per 15 Degree Rule".
   - Changes in track in loop segments or during prescribed roll.
   - Roll rate not constant.

16. **Triangle Loop, base on top, 1/2 rolls in 45 degree legs (D):** From upright, push a 3/8 outside loop to a 45 degree downline, hesitate, perform a ½ roll, hesitate, pull a ¼ inside loop to a 45 degree upline, hesitate, perform a ½ roll, hesitate, push a 3/8 outside loop to exit upright.

   Downgrades:

   - Upline and/or downline not 45 degrees.
   - Upline and downline not of equal length.
   - Loop segments not round and of equal size and radius.
   - Roll elements not centered on line.
   - Over or under rotation of prescribed roll. Apply "One Point per 15 Degree Rule"
   - Changes in track during loop segments.

17. **1/2 Reverse Cuban from top, 1/2 roll on 45 (T):** From upright, push a 1/8 outside loop to a 45 degree downline, hesitate, perform a ½ roll, hesitate, push a 5/8 outside loop to exit upright.

   Downgrades:

   - Loop segments not round and of equal radius.
   - Changes in track during loop segments or during prescribed roll.
   - Roll elements not centered on 45 degree downline.
   - Under or over rotation of roll elements. Apply "One Point per 15 Degree Rule".
   - 45-degree downline not at 45 degrees. Apply "One Point per 15 Degree Rule".

18. **Three Turn Spin (U):** From upright, approach center with decreasing speed until stall occurs at center, perform the required 3 turns of rotation (spins) and stop with the wings perpendicular to the flight line in a vertical downline, hesitate, perform a ¼ inside loop to exit upright. All spins begin and end with a horizontal line. In order to accomplish a spin, the model must be stalled. The entry should be flown in a near horizontal track with a nose high attitude increasing as the speed decreases. The nose then drops as the model stalls.

Simultaneously, the wing drops in the direction of the spin. Spin entry (i.e. stall/break) for center maneuvers should occur directly in front of the judges on the center line/pole. The stall may occur while the airplane has forward motion with respect to the ground.

Downgrades:

- Snap roll or unstalled entry - **0 pts**
- Model climbs or dives during entry. Apply "One Point per 15 Degree Rule" (Entry ends with the stall).
- Model climbs or dives during exit. Apply "One Point per 15 Degree Rule" (Exit begins at completion of quarter loop to level flight).
- Wings not level during entry or exit.
- At stall, spin is forced in the opposite direction to initial wing drop.
- Wings not perpendicular to flight line at end of required number of turns. Apply "One Point per 15-Degree Rule".
- Spiral dive or pure rotation around roll axis of more than ½ 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.**
- See Description of Maneuvers (Spins) in AMA Competition Regulations for additional criteria.

19. **Landing Sequence (U):** The landing maneuver will be scored in ½ point increments from 10 to 0. The maneuver will start 2 meters from the ground. The model flares smoothly, dissipating flying speed, and then smoothly touches the ground within the landing zone. The maneuver should be considered complete once the plane has slowed below flying speed and rolled 10 meters or comes to a stop and no further downgrades shall be applied after that point. The landing zone shall be marked by lines placed perpendicular across the runway and spaced 30 meters apart. The width of the landing zone is normally the width of the runway but in no case shall it exceed 30 meters. Landing is not a centered maneuver and there is no downgrade for displacement of the touchdown point left or right from center as long as the landing is in the landing zone. If the touchdown is within the runway but not in the landing zone it should be downgraded proportionate to the distance outside the landing zone. The Contest Director may designate any landing zone appropriate to the field if safety considerations dictate. If the landing zone is anything other than standard it should be thoroughly discussed with the pilots and judges before flying is started and no downgrade shall be applied due to the touchdown in the non-standard landing zone.

The landing will not be downgraded if:

- 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.
- The model rolls to a controlled stop within 10 meters.
- Displacement of touchdown point left or right as long as the landing is in the landing zone.

Downgrades:

- Model passes behind the judge's 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.
- 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.
- Failure to call beginning of maneuver