

## Freestyle Half-Pipe Manoeuvres

No.	Manoeuvre	K-Factor
1	ONE INSIDE LOOP	5
2	ONE ROLL	5
3	SPLIT S	5
4	STALL TURN	6
5	IMMELMAN	6
6	STRAIGHT INVERTED	7
7	HALF CUBAN EIGHT	7
8	HALF REVERSE CUBAN EIGHT	7
9	TWO INSIDE LOOPS	8
10	TWO ROLLS	8
11	THREE TURN SPIN	8
12	DOUBLE IMMELMAN	9
13	OUTSIDE STALL TURN	9
14	THREE INSIDE LOOPS	10
15	CUBAN EIGHT	10
16	VERTICAL EIGHT	10
17	SLOW ROLL	11
18	REVERSE CUBAN EIGHT	11
19	THREE OUTSIDE LOOPS	12
20	SQUARE LOOP	12
21	HORIZONTAL EIGHT	12
22	INVERTED EIGHT	12
23	FIGURE M	12
24	THREE ROLLS	13
25	FOUR POINT ROLL	14
26	ALTERNATING ROLL	14
27	ROLLING LOOP	14
28	HORIZONTAL EIGHT WITH CENTRE ROLLS	14
29	TWISTED LOOP	14
30	ROLLING EIGHT	15
31	FOUR POINT TOSS ROLL	15
32	EIGHT POINT ROLL	15
33	SHARKS TOOTH	16
34	FOUR POINT ROLLING CIRCLE	20

1. **One Inside Loop.** The model flies straight and level (S & L), performs one inside loop and then flies S & L.



2. **One Roll.** The model flies S & L, rotates smoothly around its longitudinal axis and then flies S & L.



3. **Split S.** The model flies S & L, performs one half roll, immediately followed by one half loop, and then flies S & L.



4. **Stall Turn.** The model flies s & l at 90 degrees to the centre line and just past the centre line, performs one-quarter of an inside loop (to a vertical attitude, and at a position about 45 degrees from the centre line from the viewpoint of the judges), continues to fly vertically upwards for a short distance, yaws (into wind) through 180 degrees, flies vertically downwards for a short distance, performs one-quarter of an inside loop, then flies s & l at the same altitude but on the opposite heading to the start of the manoeuvre.  
**Note:** A score of zero should be given if the model falls more forward or backward than sideways.



5. **Immelman Turn.** The model flies S & L, performs one half loop, immediately followed by one half roll, and then flies S & L.



6. **Straight Inverted Flight.** The model flies S & L, performs one half roll, flies S & L inverted for about five seconds, performs a second half roll, and then flies S & L.

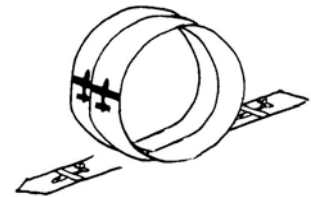


7. **Half Cuban Eight.** The model flies S & L, performs five-eighths of a loop (to an inverted 45° diving attitude), performs one half roll (the centre of the half

roll being at the height of the centre of the loop), performs one eighth of a loop then flies S & L at the same altitude but opposite heading as the start.

8. **Half Reverse Cuban Eight.** The model flies S & L with the manoeuvre starting before the centreline, performs one-eighths of a loop up the 45° line and half roll to inverted on centreline into five eighths of a loop then flies S & L at the same altitude but opposite heading to the start.

9. **Two Inside Loops** The model flies S & L, performs two consecutive inside loops and then flies S & L.



10. **Two Rolls** The model flies S & L, rotates 720° around its longitudinal axis and then flies S & L.



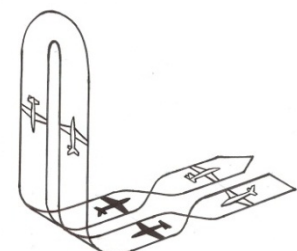
11. **Three Turn Spin** The model flies S & L into wind, slows down until it stalls and, in a fully stalled condition, falls into a spin. At the end of three revolutions the model recovers from the spin, flies vertically downwards to regain flying speed, performs one-quarter of a loop, and then flies S & L in the same direction as the start of the manoeuvre.



12. **Double Immelman** The model flies S & L and performs one half loop, immediately performs one half roll, flies S & L for about one second, performs one half outside loop, immediately performs one half roll then flies S & L at the same altitude and heading as the start of the manoeuvre.

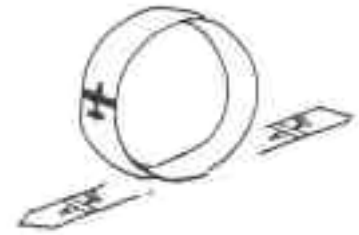


13. **Outside Stall Turn** The model flies S & L then rolls 180° to inverted on the centreline. The model then pushes to vertical and performs a stall turn. Push to inverted level attitude on the base line and roll 180° back to wings level and upright on the centreline.

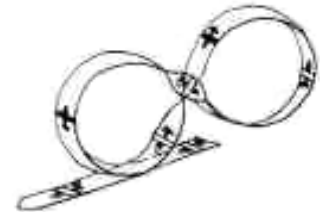


Model exits flying S+L.

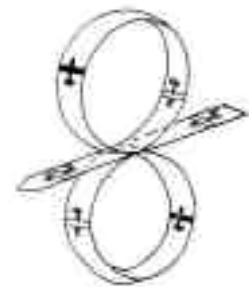
14. **Three Inside Loops** The model flies S & L, performs three consecutive inside loops and then flies S & L.



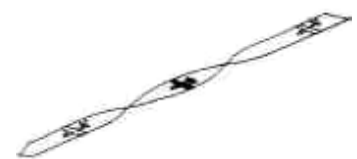
15. **Cuban Eight** The model flies S & L, performs five-eighths of a loop (to an inverted 45° diving attitude), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs three quarters of a loop (to an inverted 45° diving attitude, with the centre of the loop at the same altitude as the first loop), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs one eighth of a loop then flies S & L at the same altitude and heading as the start.



16. **Vertical Eight** The model flies S & L, performs one inside loop, immediately performs one outside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre.



17. **Slow Roll** The model flies S & L, performs one roll then flies S & L. The roll shall be at a uniform rate and shall take approximately five seconds. **Note:** A significantly faster roll should be downgraded proportionately, e.g. a roll executed in approximately 3 seconds should be downgraded 50%, and a roll executed in 1 second scored zero.



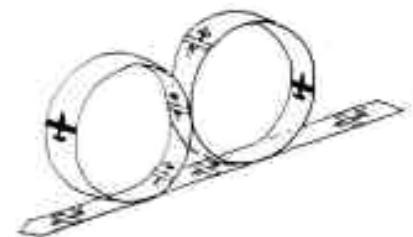
18. **Reverse Cuban Eight** The model flies S & L with the manoeuvre starting before the centreline, performs one-eighths of a loop up the 45° line and half roll to inverted on centreline into three quarters of a loop, up the 45° line and half roll to inverted on centreline, performs five eighths of a loop then flies S & L at the same altitude and heading as the start.

19. **Three Outside Loops** The model flies S & L, performs three consecutive outside loops (downward) and then flies S & L.

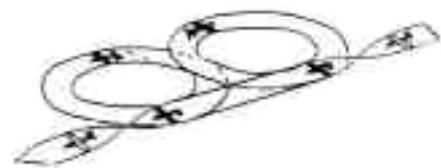


20. **Square Loop** This is a variation of the basic loop. The two vertical lines and the horizontal line on top have to be of the same length. The exit line at the bottom has to be at least as long as the other three sides. The quarter loops that connect the four sides have to have the same radius at each corner.

21. **Horizontal Eight** The model flies S & L, performs three-quarters of an inside loop (to a vertically downward attitude), performs one outside loop (to a vertically downward attitude), performs one quarter of an inside loop then flies S & L at the same altitude and heading as the start of the manoeuvre.



22. **Inverted Eight** The model flies S & L across wind, performs one half roll to an inverted attitude, turns (into wind) through  $90^\circ$ , immediately turns in the opposite direction through  $360^\circ$ , immediately turns in the first direction through  $270^\circ$ , performs one half roll, then flies S & L at the same altitude and heading as the start of the manoeuvre.



23. **Figure M** The model flies S & L, performs one quarter of an inside loop, continues to fly vertically upwards for a short distance, yaws (into wind) through  $180^\circ$ , flies vertically downwards for a short distance, performs one half of an outside loop, continues to fly vertically upward for a short time, yaws (into wind) through  $180^\circ$ , flies vertically downward for a short distance, performs one quarter of an inside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre. **Note:** A score of zero should be awarded if, in either stall turn, the model falls more forward or backward than sideways.



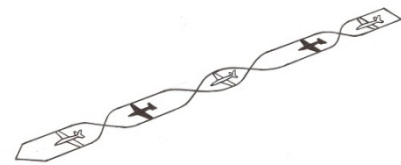
24. **Three Rolls** The model flies S & L, performs three consecutive rolls, and then flies S & L.



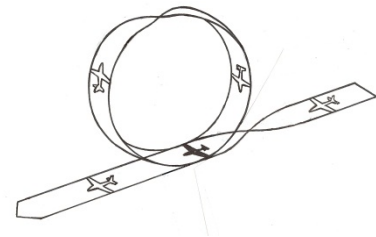
25. **Four Point Roll** The model flies S & L, rolls through 90° to a knife-edge attitude, hesitates briefly before repeating the quarter-rolls and hesitations back to a wings-level attitude, then flies S & L.



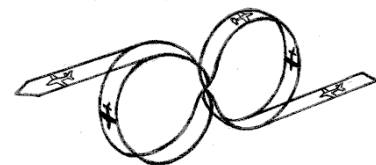
26. **Alternating Roll** The model flies S & L then rolls 180° to inverted, hesitates then rolls 360° in the opposite direction back to inverted, hesitates and then rolls 180° again in the original direction back to wings level and upright and exits flying S & L. Half way through the 360° roll must be on the centre line.



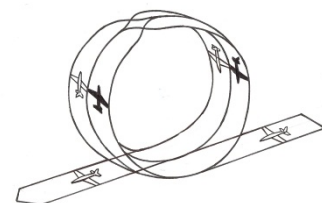
27. **Rolling Loop** The model flies S & L then rolls 180° to inverted on the centreline and immediately pushes half an outside loop. At the top the model rolls 180° to inverted and pulls the second half of the loop to exit wings level and upright. Model finishes by flying S & L.



28. **Horizontal Eight with Centre Rolls.** Enter with wings straight and level, before the centre line, pull the first ¼ of a loop and perform a half roll which is on the centre line. Continue by pushing a complete outside loop and again on the centre line, perform a half roll. Push 5/4's of an outside loop to exit upright and with wings straight and level.

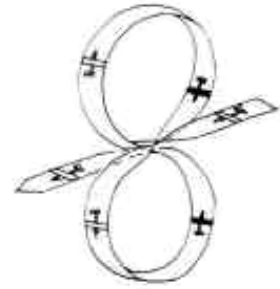


29. **Twisted Loop** The model flies S & L, on the centreline pull half a loop. At the top of the loop the model rolls 180° to upright then performs one full outside loop where at the top of the loop again the model rolls 180° to inverted and pulls half a loop to finish wings level and upright on the centre line.

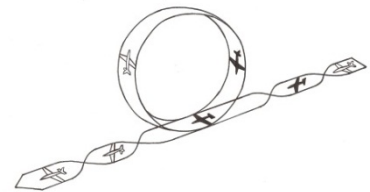


Model exits flying S & L.

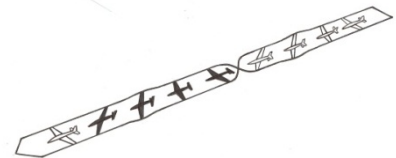
30. **Rolling Eight.** The model flies s & l, performs one half roll, performs one outside loop (upward), performs one half roll, performs one outside loop (downward), then flies s & l. The half roll is performed simultaneously with the last portion of the first loop and the first portion of the second loop.



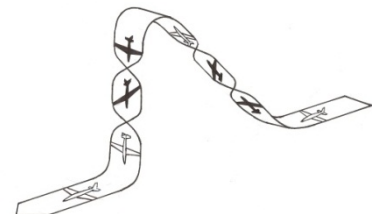
31. **Four Point TOSS Roll** The model flies S & L then performs two points of a four point roll, on the centre line the model performs an outside loop followed by the remaining two points of the four point roll. Model exits flying S & L.



32. **Eight Point Roll** The model flies S & L then performs eight 45° rolls with equal hesitations between each 45° ending with wings level attitude and flying S & L. Plane must be horizontal inverted when on the centre line.



33. **Sharks Tooth** The model flies S & L then pulls to a 45° up line. Half way to the top the model performs two points of a four-point roll. At the top of the 45° line, pull a tight radius (as on a square loop) to a vertical down line which must be on the centreline. Half way down the model must perform two points of a four-point roll and then is pulled to wings level and upright on the base line. Model finishes by flying S & L.



34. **Four – point Rolling Circle** The model flies S & L across wind, turns (into wind) through 90° and performs one quarter roll to a knife edge attitude, turns through 90° and performs one quarter roll to an inverted attitude, turns through 90° and performs one quarter roll to a knife edge attitude, turns through 90° and performs one quarter roll to an upright attitude and then flies S & L at the same altitude and heading as the start of the manoeuvre.