IMAC

THE INTERNATIONAL SCALE AEROBATICS SCHOOL

EUROPE

IMAC EuroPeans

IMAC EuroCup

Flying and Judging Scale Aerobatics

- Pilots and Judges Seminar -

IMAC THE INTERNATIONAL SCALE AEROBATICS SCHOOL EUROPE

IMAC Purpose

- IMAC is a global semi-scale aerobatics training school.
- Our mission is to facilitate the growth of as many Pilots from Basic to Unlimited level.
- Competitions are assessment tests enabling to project personal improvement for Pilots and Judges
- Pilots and Judges need to share the same competency base.
- Judging is more difficult than Flying.

Agenda

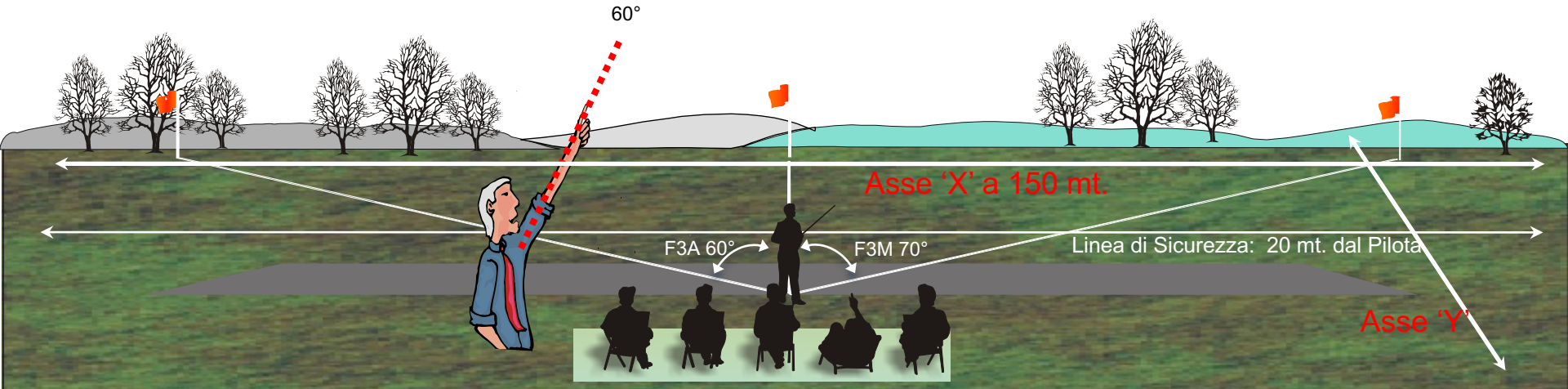
A. Flight Space and Procedures
B. Aresti Symbols
C. General Judging Criteria
D. Specific Judging Criteria by Aresti Family
E. Judging Principles

Agenda .A

Flight Space and Procedures

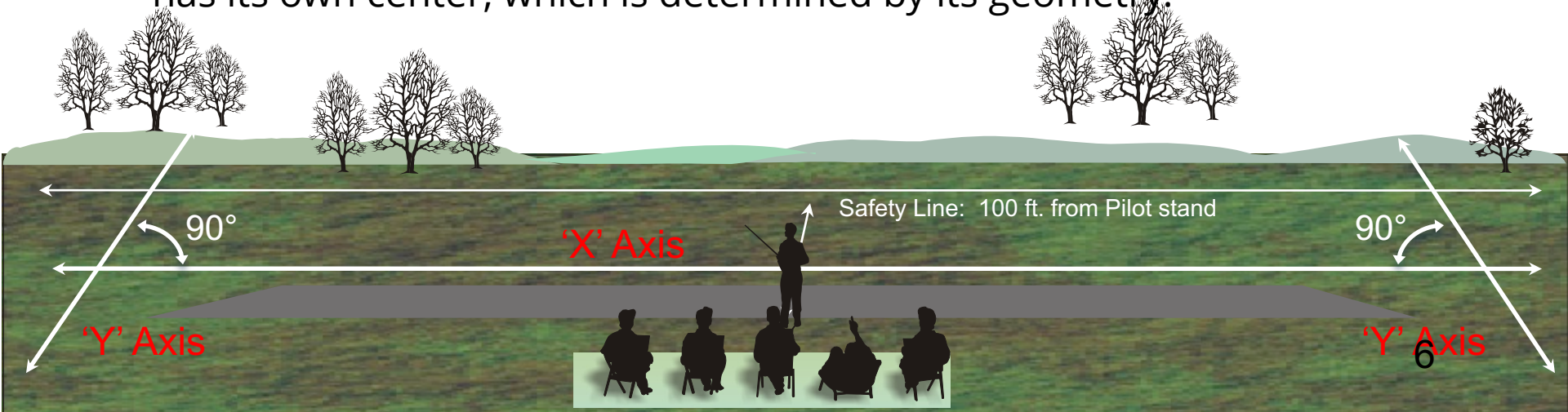
Box F3A – F3M

- The vertical plan of execution has to be positioned at 150mt. from the Pilot
- The lateral space is limited to 60° for F3A and 70° for F3M
- The vertical space is limited to 60° on the Judges vertical
- The 'Y' axis is used for "Cross-Box" maneuvers and is orthogonal to the 'X' axis
- Exit from the Box is penalized for each maneuver
- The whole sequence has to be centered on the Box center
- The safety line is at 20mt. from the Pilot



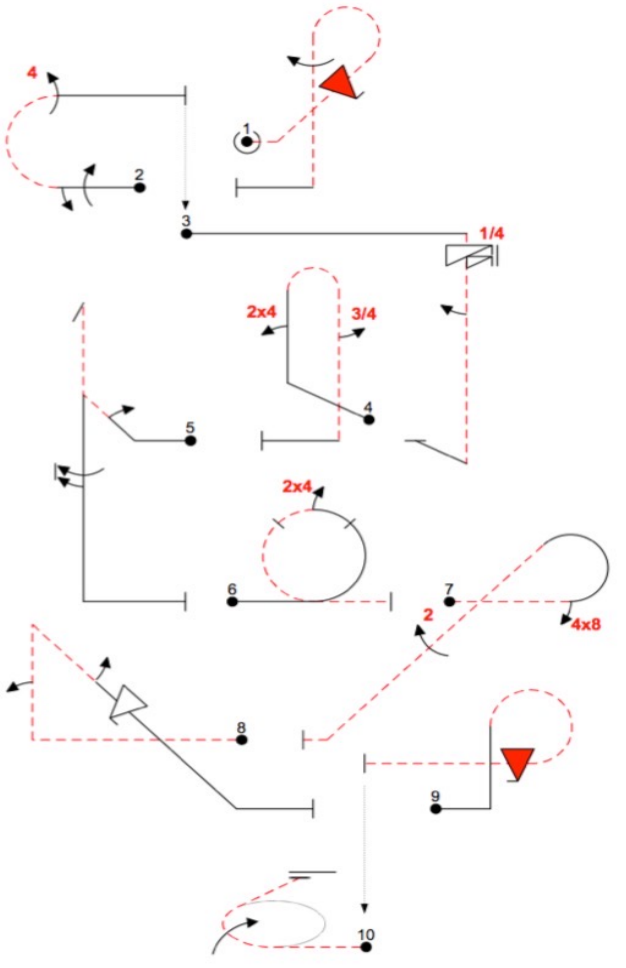
IMAC Airspace

- The position of the 'X' Axis is set by the Pilot when drawing the flight path entering the first maneuver.
- Air Space is not limited to the right, left or in vertical.
- The 'X' Axis cannot be positioned at less then 100 ft. from the Pilot stand in order not to penetrate the Safety Line.
- Air Space Control is evaluated as a function of the Pilot's ability to position each maneuver in a way to be properly viewed by the Judges.
- The sequence of all maneuvers doesn't have a center. The distance between maneuver is at discretion of the Pilot. However, each maneuver has its own center, which is determined by its geometry.



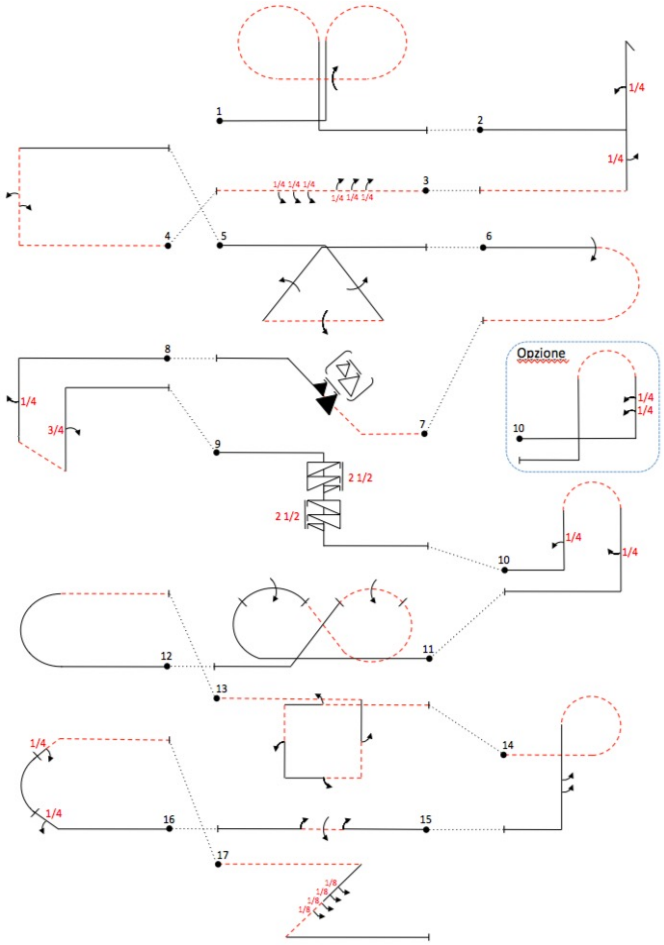
Sequence Structure

IMAC
Mostly Lateral Maneuvers



Wind Direction

F3A – F3M
Always Central-Lateral-Central



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Attempt Structure

- An attempt (the performance of a sequence) begins when the pilot or caller makes a vocal declaration such as "In the box”. A vocal signal is mandatory to initiate the attempt. If a vocal declaration is not made the pilot becomes subject to the other standard constraints stipulated in these rules, e.g., time limit for entering, no aerobatics before entering, etc.

- The first figure of a sequence begins at the moment the aircraft departs from its wings-level, horizontal flight path.

- A figure is complete at the moment the aircraft returns to a wings-level, horizontal flight path of one fuselage plane length.

- Once a horizontal flight path of one fuselage plane length is established at the end of a figure, the beginning of the next figure is deemed to have occurred.

Special Situations

- ***Pre-Sequence Turnarounds*** - Only listed turnaround figures in the rule book are allowed.
- ***Break in sequence*** - Pilot repositions and performs the last flown maneuver that is to be zeroed, and continue the sequence from there on.
- ***Break Penalty*** assessed on exit in wrong direction or 180° deviation in roll.
- ***Dead Sticks*** All maneuvers after the dead stick will be valued zero

Judges

- ***A minimum of Two (2) judges*** should be used to judge each sequence.
- Judges should be placed at 10 mt. distance from the Pilot.
- Each Judge should not be able to hear the voice of the next.

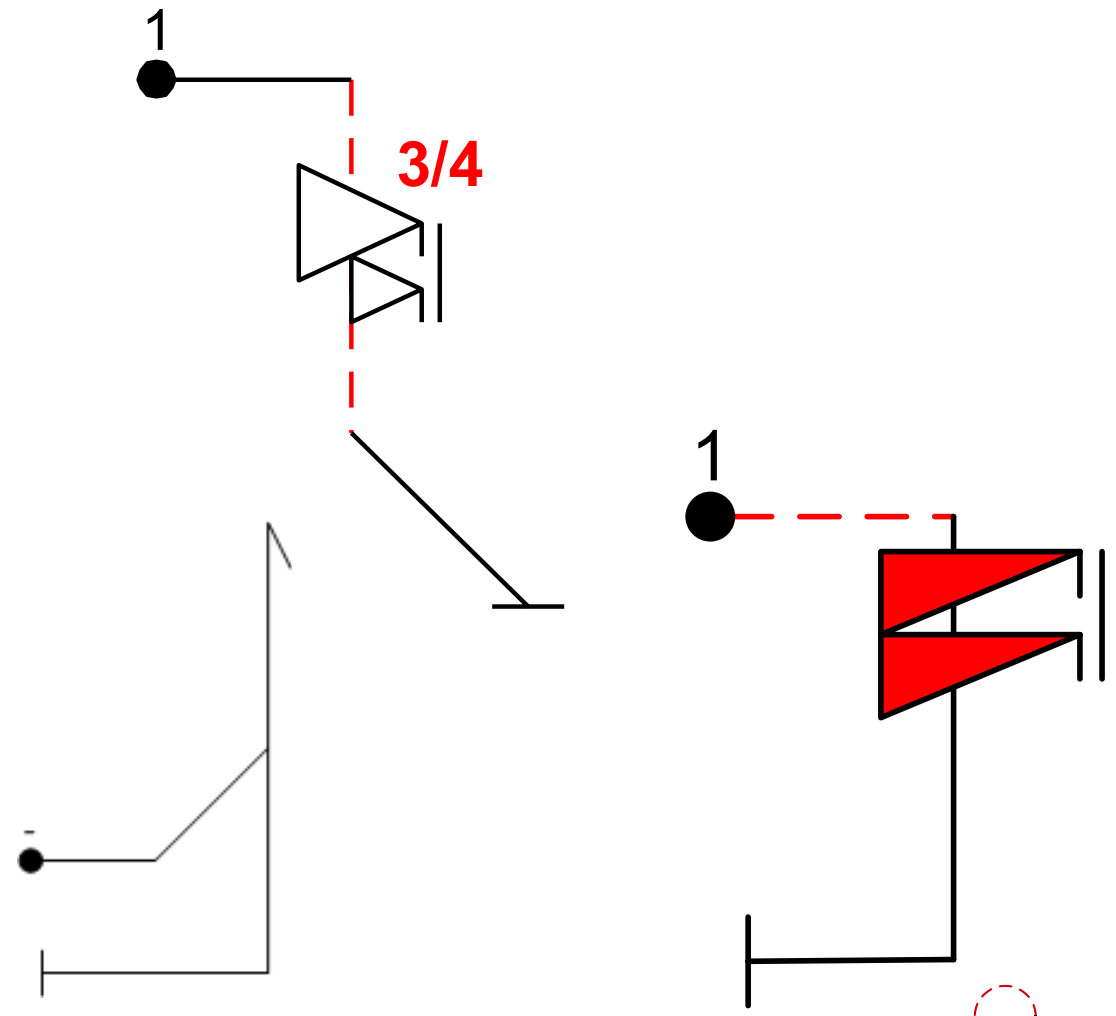
Agenda .B

Aresti Symbols

Aresti Symbols

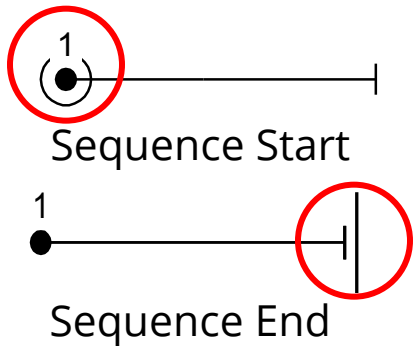
Basic Symbolism

- Lines
- Rolls
- Stalls
- Snaps
- Spins

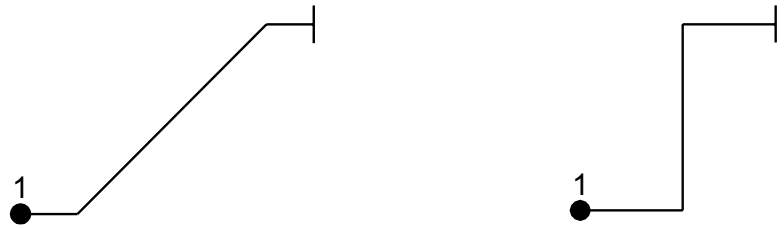


Line .1

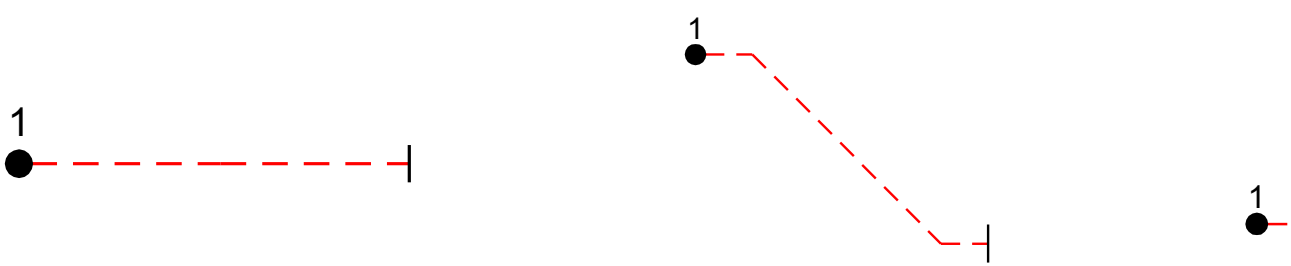
Maneuver Start and Finish



Line



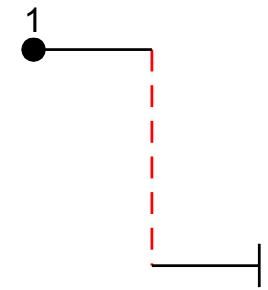
Positive or Upright Flight



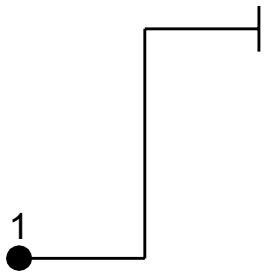
Negative or Inverted Flight

Line .2

Negative Line for Negative G attitude



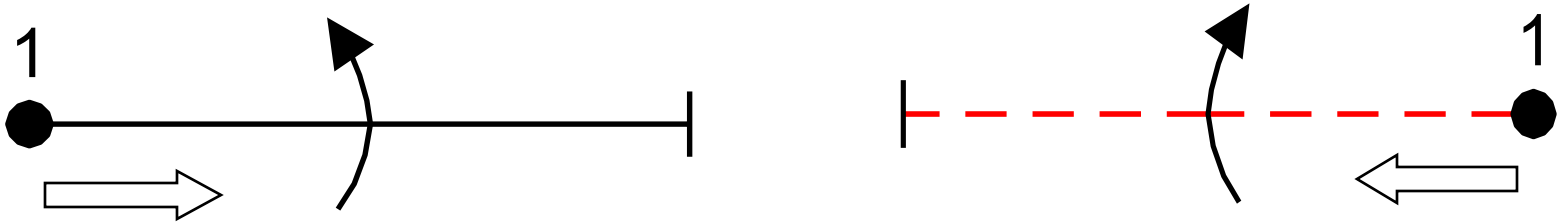
- Push to a down line.
- Negative G shown with dashed lines.
- The second pull to an upright line is shown solid.



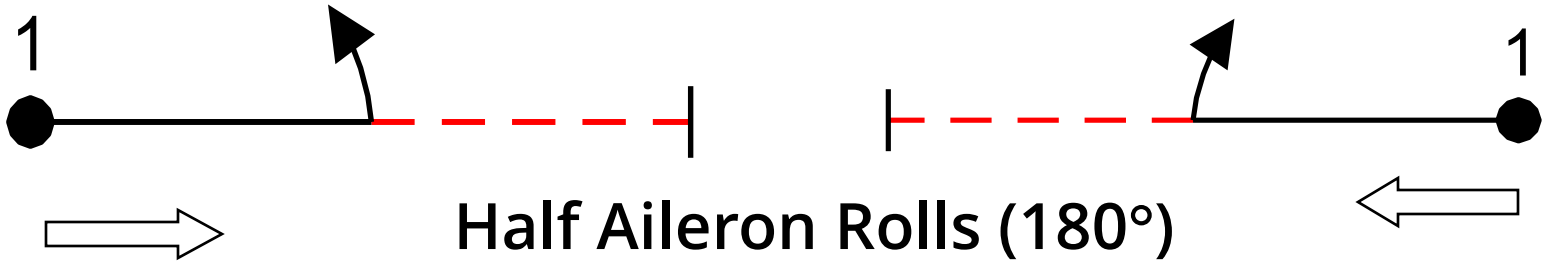
- Pull to up line.
- Shown as a solid line.
- Push to exit upright is a solid line.

Rolls .1

Direction of flight always into “cup” of arrow.



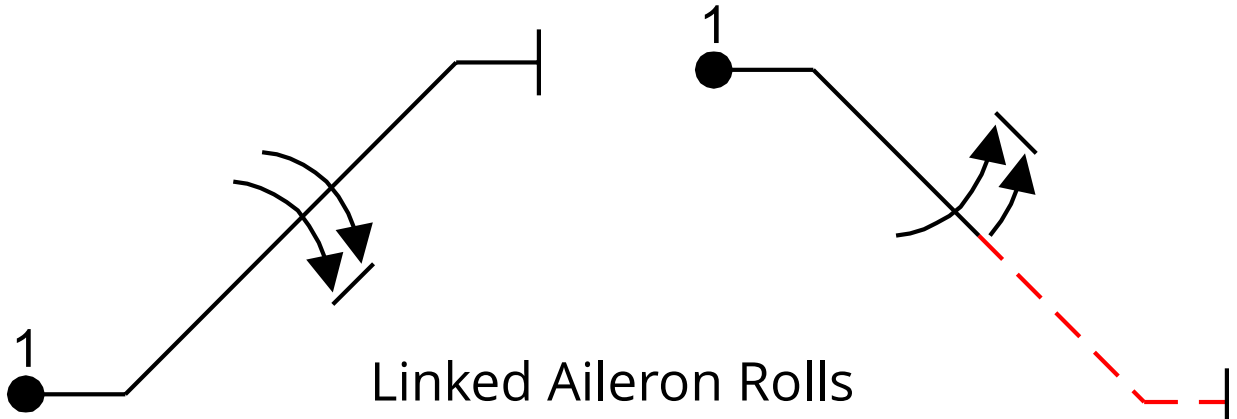
Full Aileron Rolls (360°)



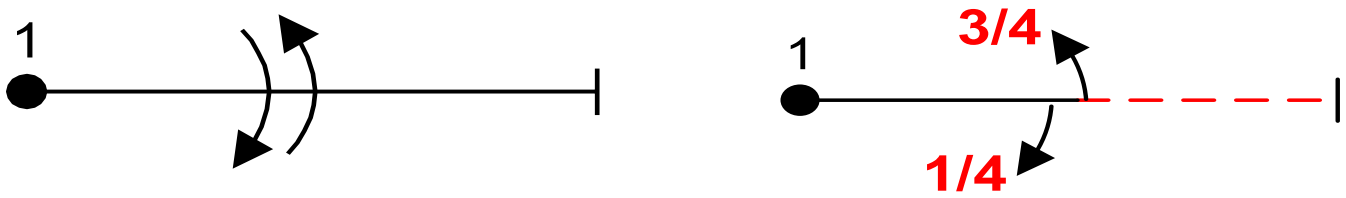
Half Aileron Rolls (180°)

Rolls .2

Link or Hesitation



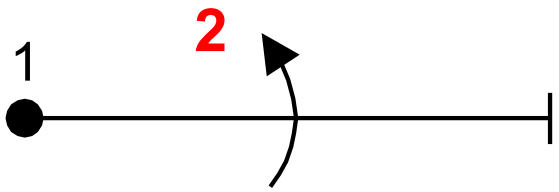
Linked Aileron Rolls



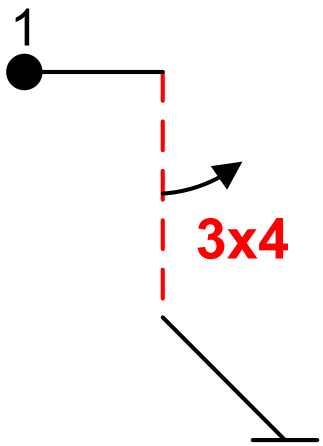
Unlinked Opposite Aileron Rolls - Hesitation

Rolls .3

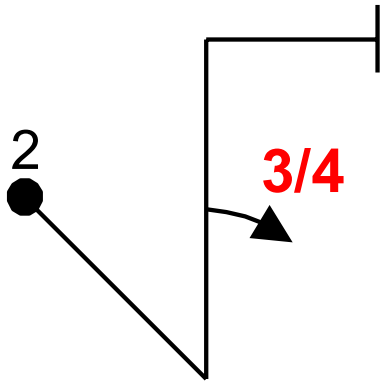
‘Cross Box’ diagonal lines describe ‘Y’ axis lines always orthogonal to ‘X’ axis.



Point Rolls - 2 - 4 - 8 -

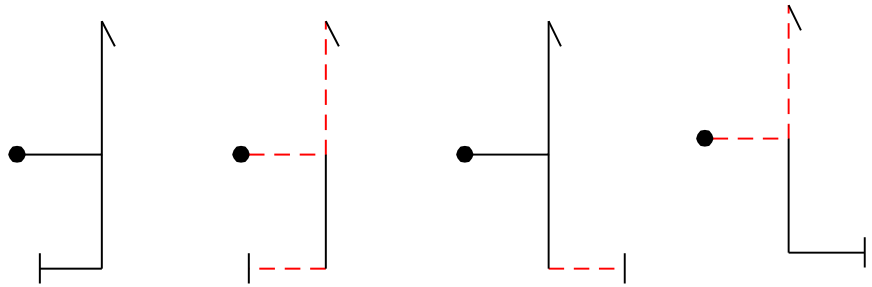


Partial Roll

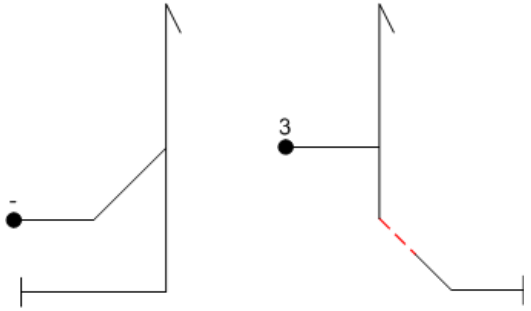


Stalls

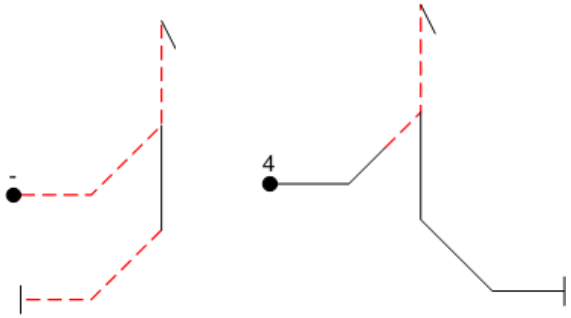
Two Lines



Three Lines

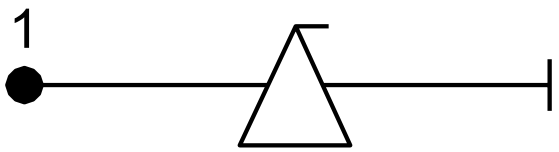


Four Lines

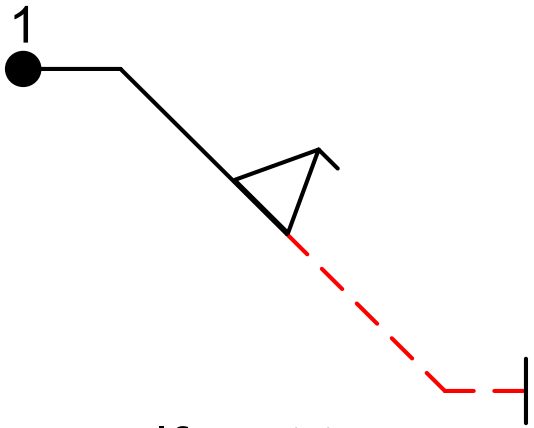


Snaps

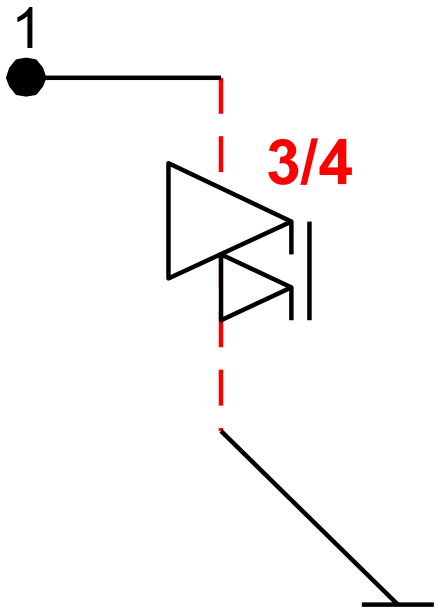
Positive and Negative



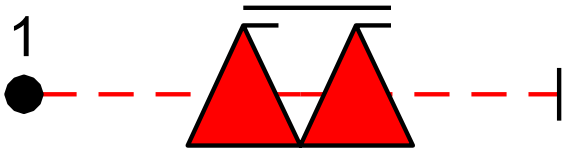
Positive Snap



Half Positive Snap



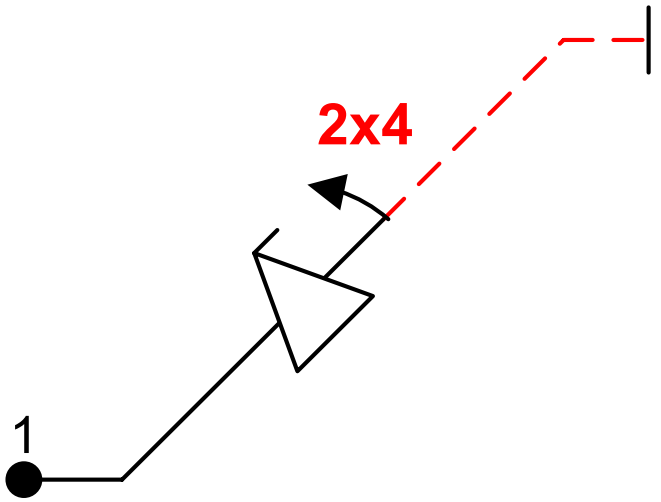
Linked Positive
1¾ Snaps



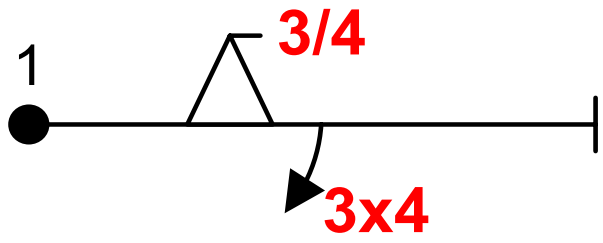
Two Linked Negative Snaps

Snaps & Rolls

Same or Opposite direction



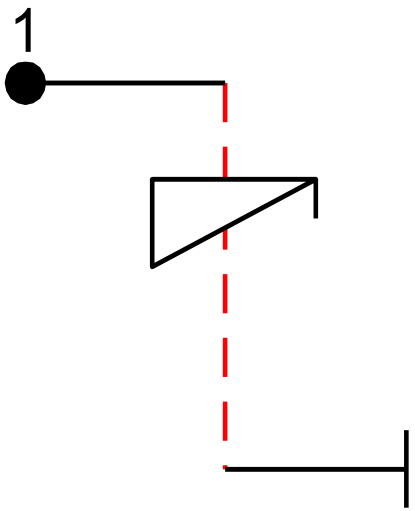
Same Direction
Positive Snap and 2 of 4 point Roll



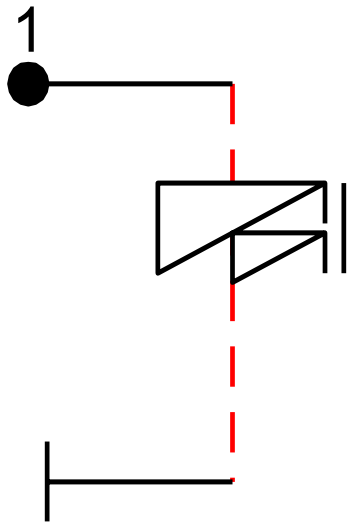
Opposite Direction
Partial Snap and Point Roll

Spins

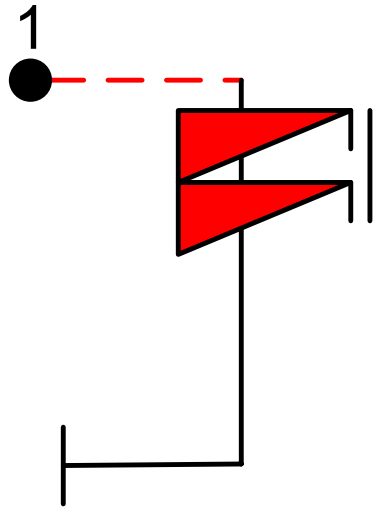
Positive and Negative



Positive Spin



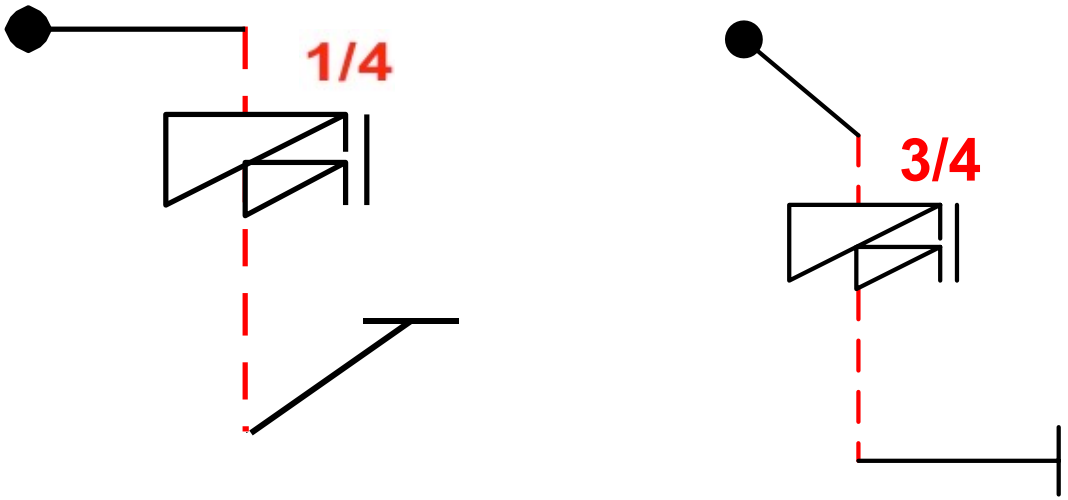
1½ Turn
Positive Spin



Two Turn
Negative Spin

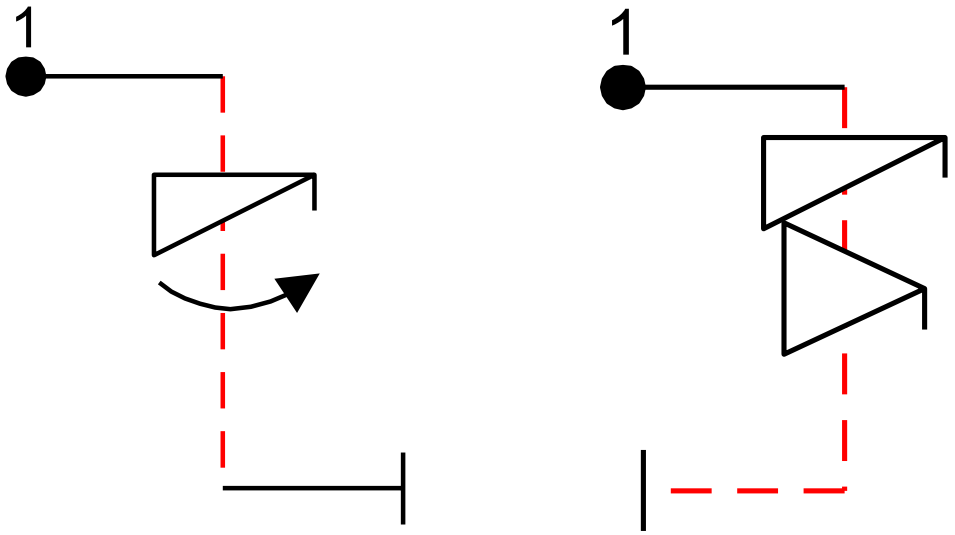
Spins .1

Quarter Spins ¼ - ¾

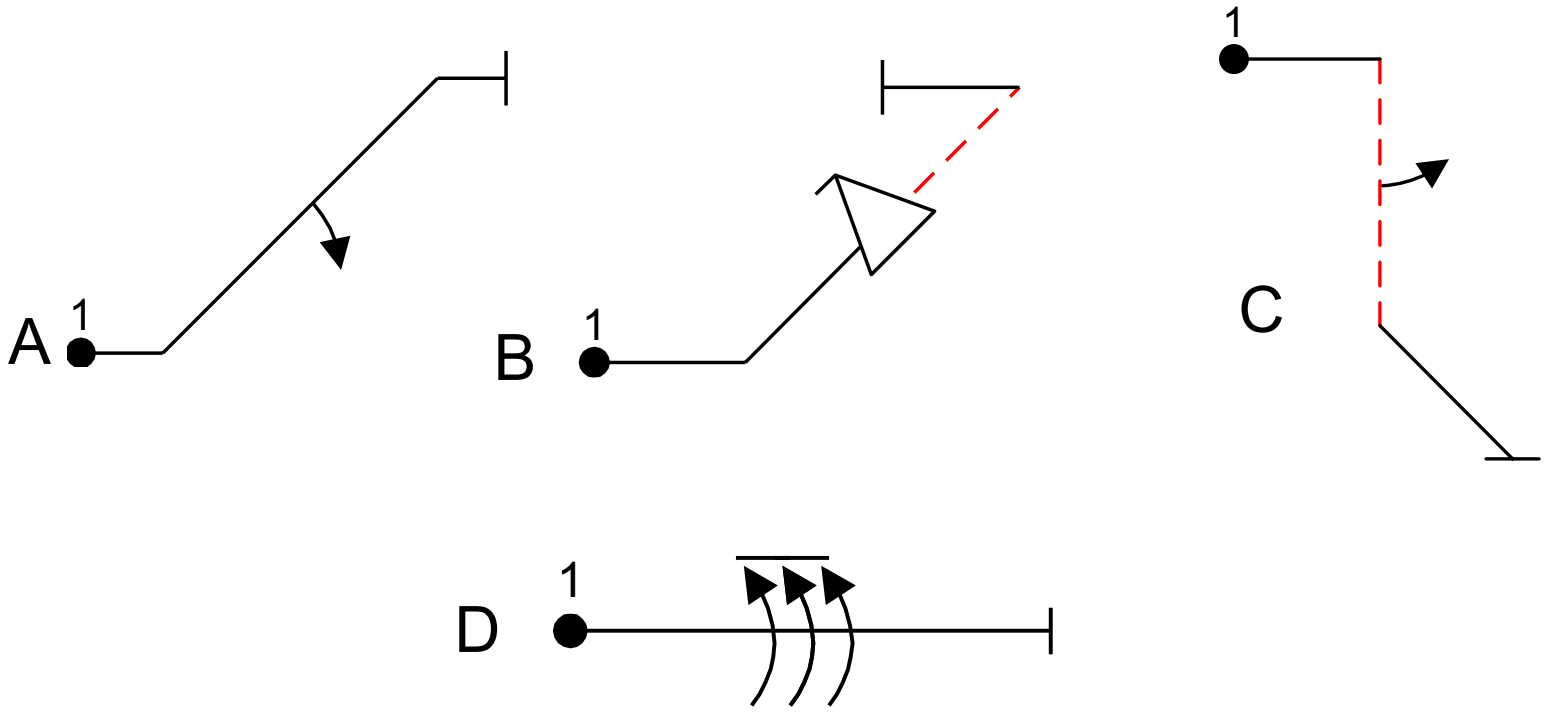


Spins & Rolls & Snaps

Rolls and Snaps can be combined with spins, but spins will always come first, since they are initialized by a stall.



What's Wrong?

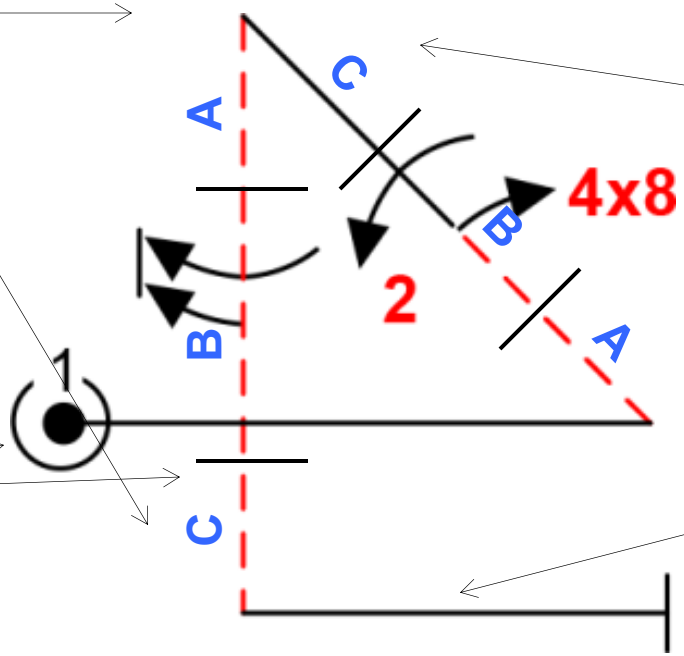


Elements & Segments

- Each complex maneuver is made of Elements
- Each Element may be made of Segments
- A and C Segment Length must always be equal
- On each Element the first rotation versus is discretional

Second Element
- 45° line
- Three Segments
  - A - Entry
  - B - Rotation
  - C - Exit

Third Element
- 90° line
- Three Segments
  - A - Entry
  - B - Rotation
  - C - Exit



First Element
- Entry Line
- No Segments

Fourth Element
- Exit Line
- No Segments

Judging Segments

- Entry and Exit Segments of each Figure Element must be of the same length, an observed variation is penalized by reducing the grade in the following manner:
- Visible variation: - 1 point
- A 1:2 variation: - 2 points
- Greater than 1:2 variation: - 3 points
- No line before or after rotation: - 4 points

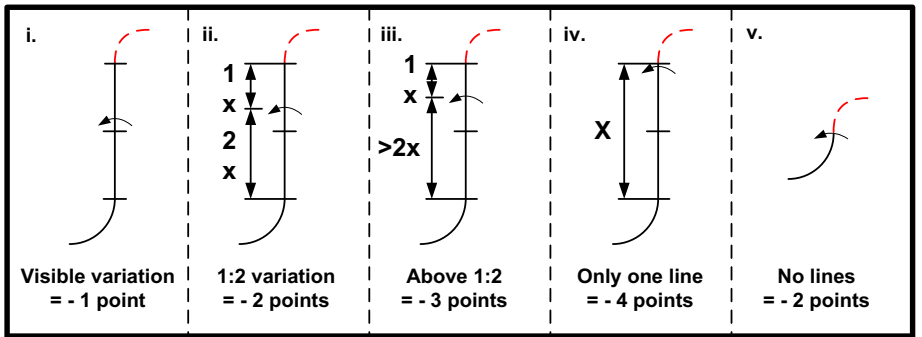


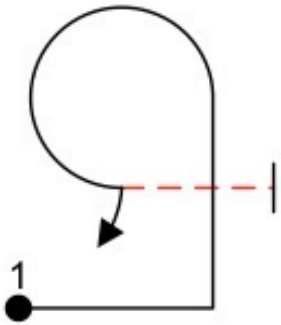
Fig. 14

- No line before and after roll: -2 points
- The basic for judging line length is the first line / segment flown.

Center or Limit

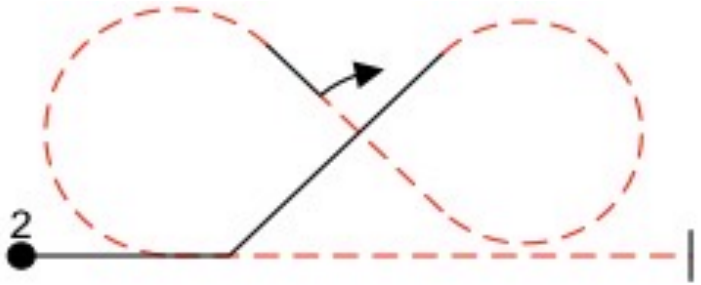
- Rotations can limit an element, at it's beginning or end.
- Rotations can be placed at the center of elements.
- When initializing, the rotation has to happen immediately before or after the loop element without hesitation.

Limiting



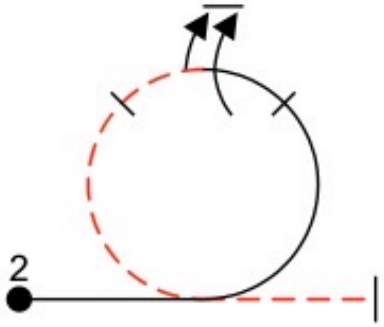
'P' Loop

Centering



Cuban Eight

Centering



Avalanche

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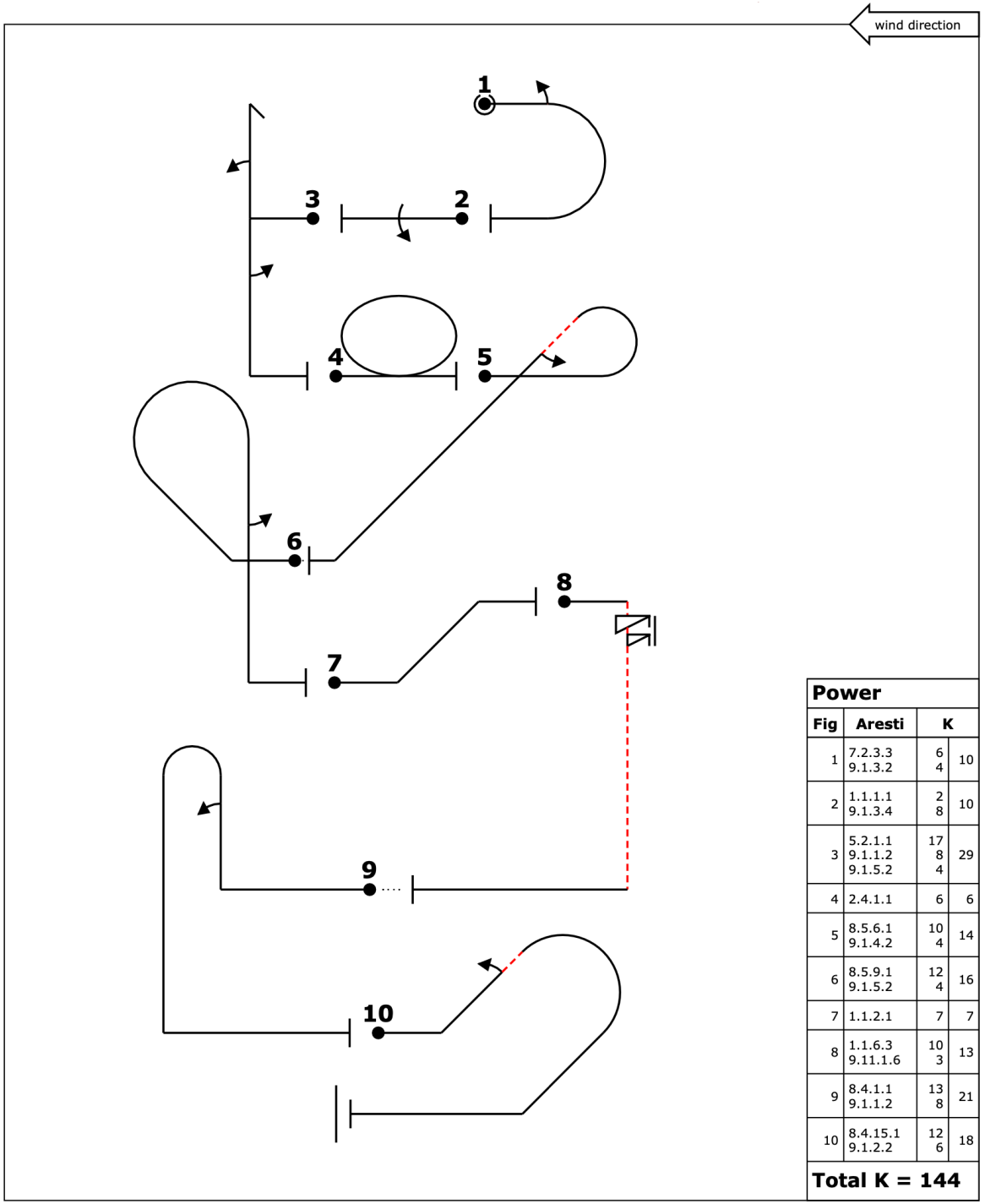
Known Basic 2025



Power			
Fig	**Aresti**	**K**	
1	7.2.3.3 9.1.3.2	6 4	10
2	1.1.1.1 9.1.3.4	2 8	10
3	5.2.1.1 9.1.1.2 9.1.5.2	17 8 4	29
4	2.4.1.1	6	6
5	8.5.6.1 9.1.4.2	10 4	14
6	8.5.9.1 9.1.5.2	12 4	16
7	1.1.2.1	7	7
8	1.1.6.3 9.11.1.6	10 3	13
9	8.4.1.1 9.1.1.2	13 8	21
10	8.4.15.1 9.1.2.2	12 6	18
Total K = 144			

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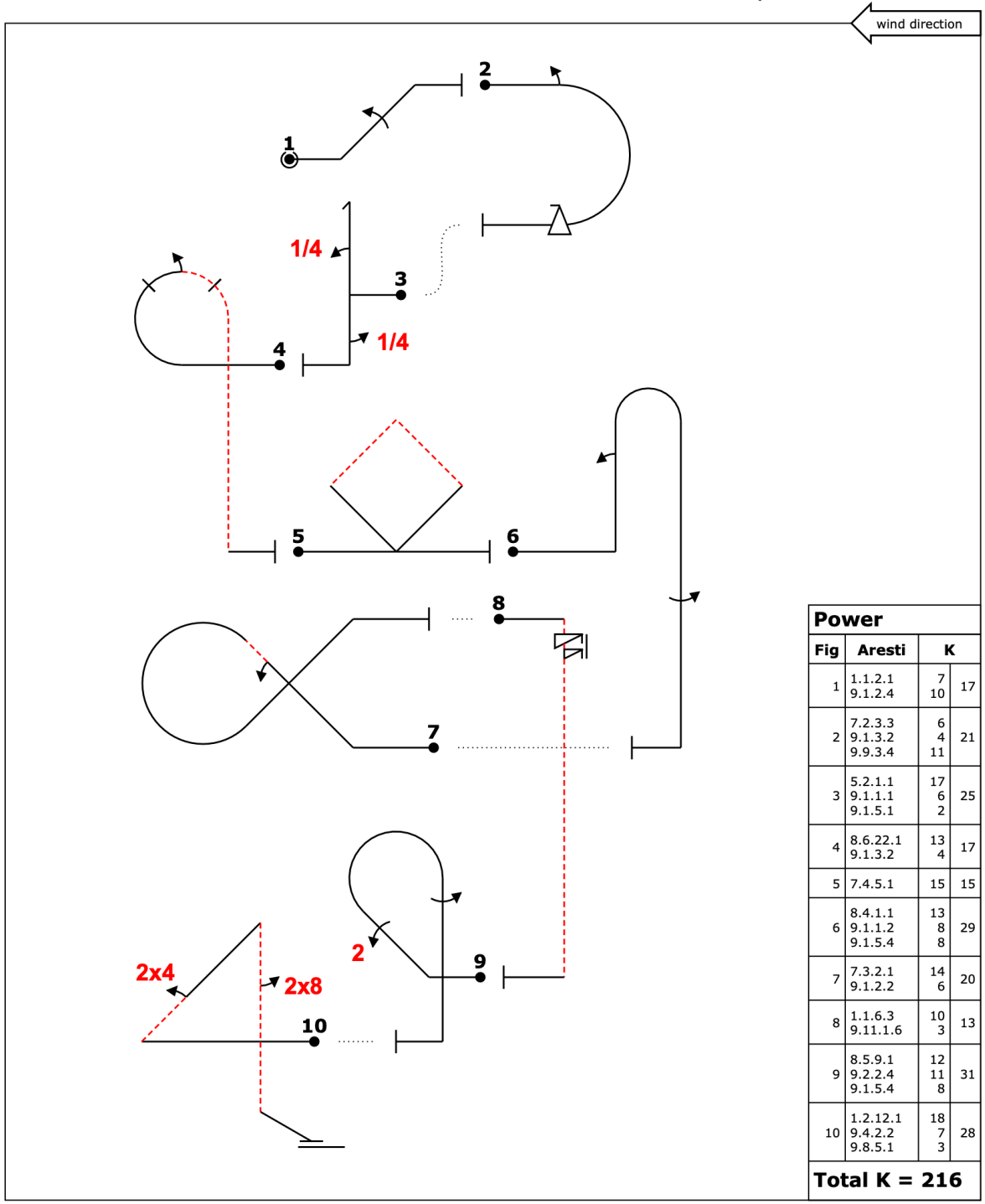
Known Sportsman 2025



Power			
Fig	Aresti	K	
1	1.1.2.1 9.1.2.4	7 10	17
2	7.2.3.3 9.1.3.2 9.9.3.4	6 4 11	21
3	5.2.1.1 9.1.1.1 9.1.5.1	17 6 2	25
4	8.6.22.1 9.1.3.2	13 4	17
5	7.4.5.1	15	15
6	8.4.1.1 9.1.1.2 9.1.5.4	13 8 8	29
7	7.3.2.1 9.1.2.2	14 6	20
8	1.1.6.3 9.11.1.6	10 3	13
9	8.5.9.1 9.2.2.4 9.1.5.4	12 11 8	31
10	1.2.12.1 9.4.2.2 9.8.5.1	18 7 3	28
Total K = 216			

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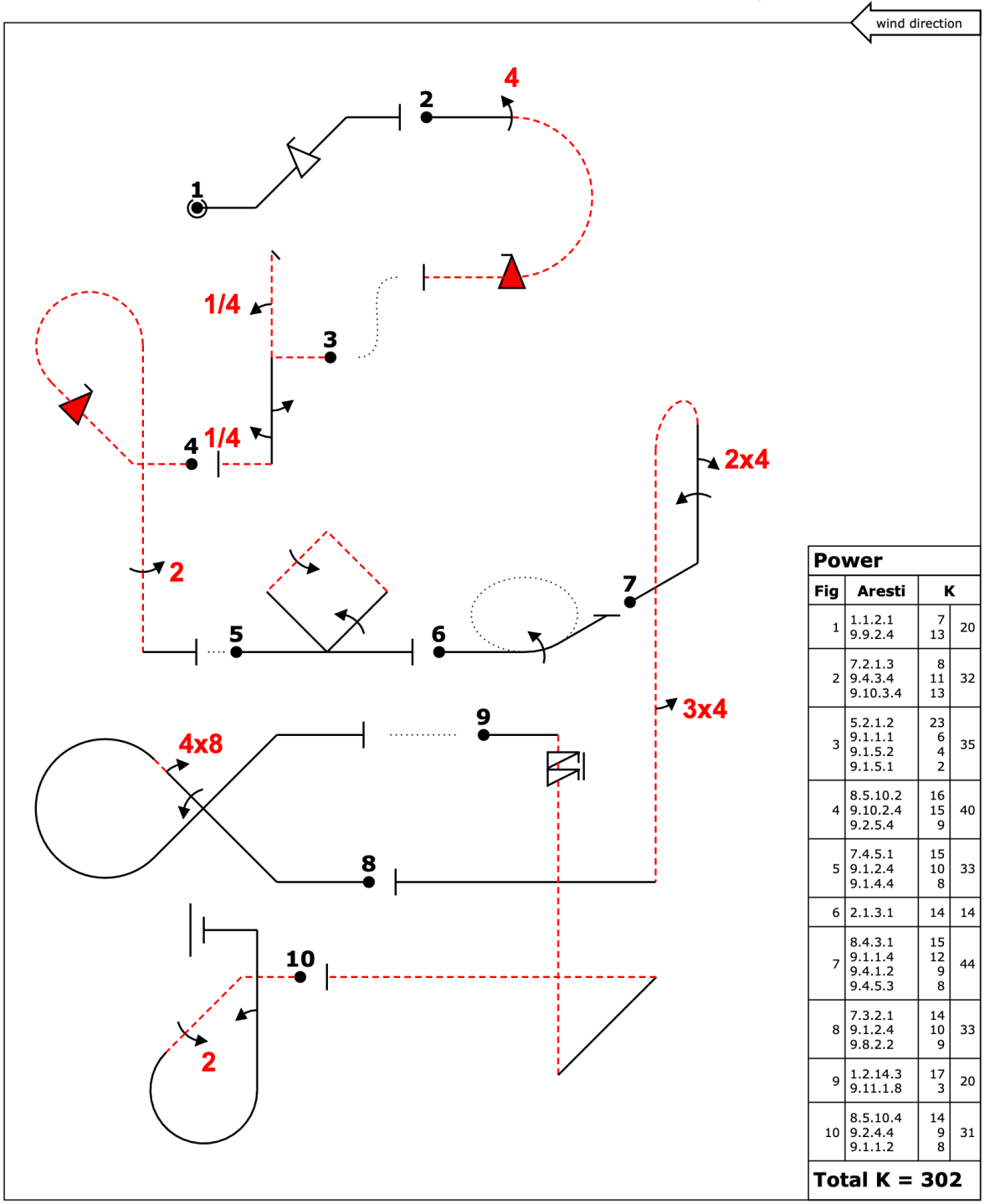

Power			
Fig	Aresti	K	
1	1.1.2.1 9.9.2.4	7 13	20
2	7.2.1.3 9.4.3.4 9.10.3.4	8 11 13	32
3	5.2.1.2 9.1.1.1 9.1.5.2 9.1.5.1	23 6 4 2	35
4	8.5.10.2 9.10.2.4 9.2.5.4	16 15 9	40
5	7.4.5.1 9.1.2.4 9.1.4.4	15 10 8	33
6	2.1.3.1	14	14
7	8.4.3.1 9.1.1.4 9.4.1.2 9.4.5.3	15 12 9 8	44
8	7.3.2.1 9.1.2.4 9.8.2.2	14 10 9	33
9	1.2.14.3 9.11.1.8	17 3	20
10	8.5.10.4 9.2.4.4 9.1.1.2	14 9 8	31
Total K = 302			

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Known Intermediate 2025

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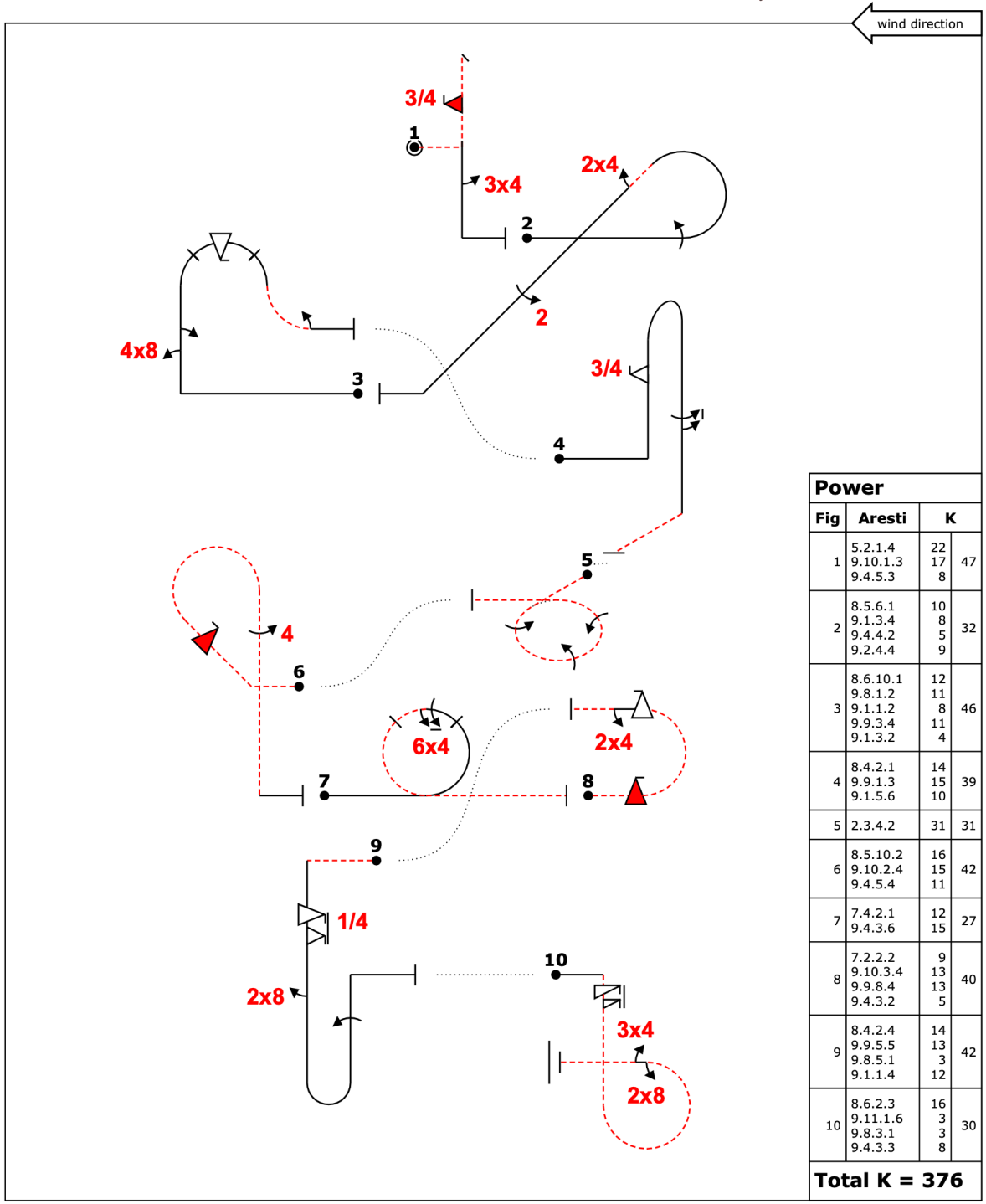

Power			
Fig	Aresti	K	
1	5.2.1.4 9.10.1.3 9.4.5.3	22 17 8	47
2	8.5.6.1 9.1.3.4 9.4.4.2 9.2.4.4	10 8 5 9	32
3	8.6.10.1 9.8.1.2 9.1.1.2 9.9.3.4 9.1.3.2	12 11 8 11 4	46
4	8.4.2.1 9.9.1.3 9.1.5.6	14 15 10	39
5	2.3.4.2	31	31
6	8.5.10.2 9.10.2.4 9.4.5.4	16 15 11	42
7	7.4.2.1 9.4.3.6	12 15	27
8	7.2.2.2 9.10.3.4 9.9.8.4 9.4.3.2	9 13 13 5	40
9	8.4.2.4 9.9.5.5 9.8.5.1 9.1.1.4	14 13 3 12	42
10	8.6.2.3 9.11.1.6 9.8.3.1 9.4.3.3	16 3 3 8	30
Total K = 376			

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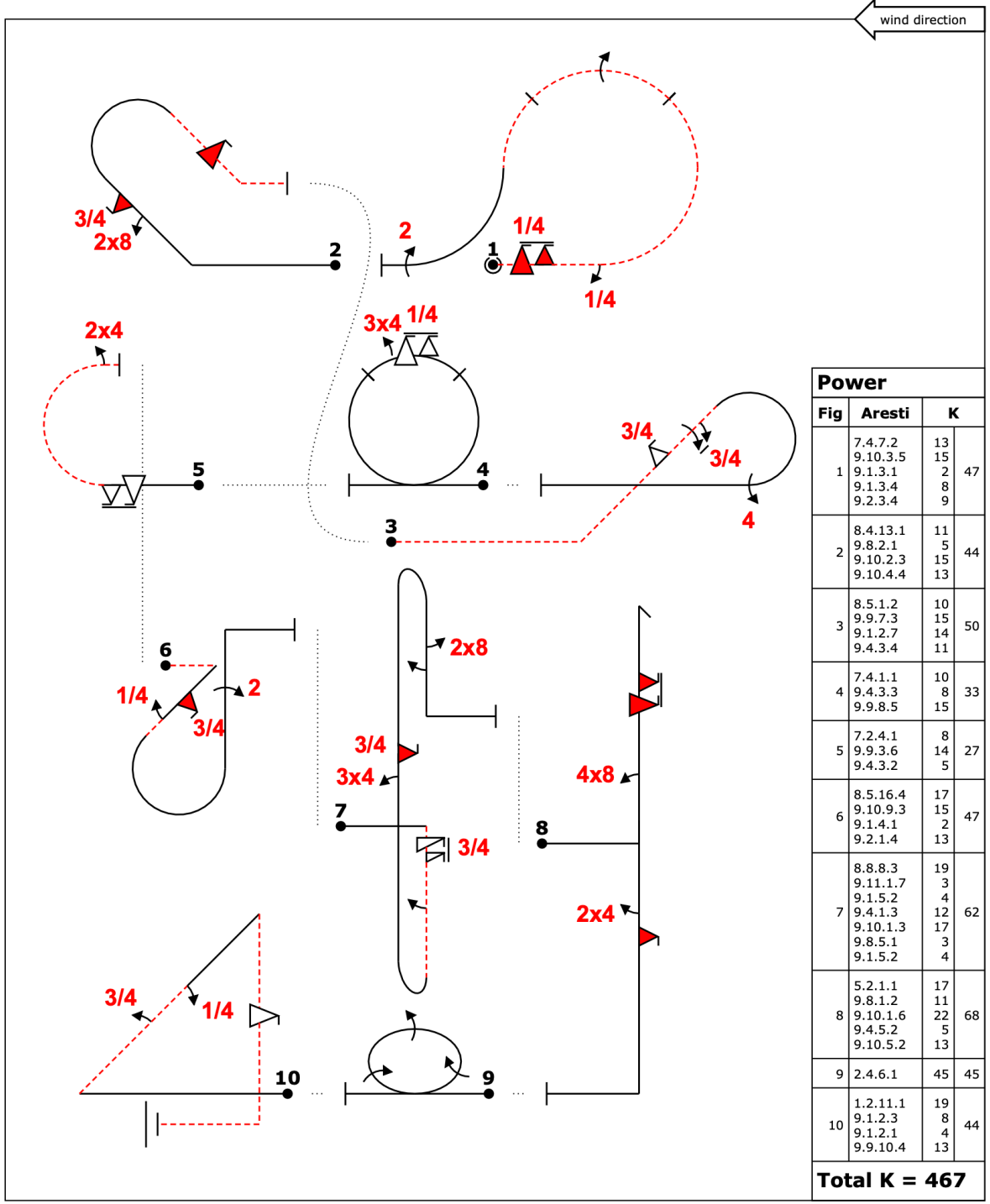

Power			
Fig	Aresti	K	
1	7.4.7.2 9.10.3.5 9.1.3.1 9.1.3.4 9.2.3.4	13 15 2 8 9	47
2	8.4.13.1 9.8.2.1 9.10.2.3 9.10.4.4	11 5 15 13	44
3	8.5.1.2 9.9.7.3 9.1.2.7 9.4.3.4	10 15 14 11	50
4	7.4.1.1 9.4.3.3 9.9.8.5	10 8 15	33
5	7.2.4.1 9.9.3.6 9.4.3.2	8 14 5	27
6	8.5.16.4 9.10.9.3 9.1.4.1 9.2.1.4	17 15 2 13	47
7	8.8.8.3 9.11.1.7 9.1.5.2 9.4.1.3 9.10.1.3 9.8.5.1 9.1.5.2	19 3 4 12 17 3 4	62
8	5.2.1.1 9.8.1.2 9.10.1.6 9.4.5.2 9.10.5.2	17 11 22 5 13	68
9	2.4.6.1	45	45
10	1.2.11.1 9.1.2.3 9.1.2.1 9.9.10.4	19 8 4 13	44
Total K = 467			

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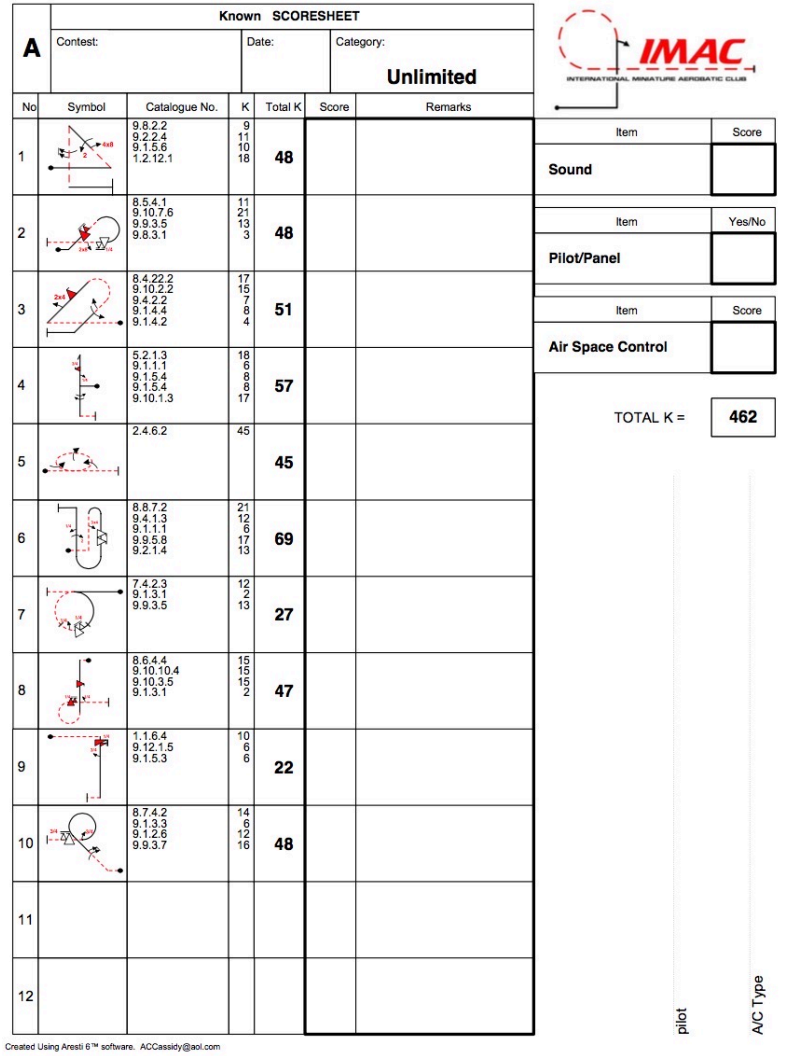
Agenda .C

General Judging Criteria

Score Sheet

- Sound
- Pilot/Panel
- Air Space Control



A — Known SCORESHEET

Contest: | Date: | Category: Unlimited

No	Symbol	Catalogue No.	K	Total K	Score	Remarks
1		9.8.2.2 9.2.2.4 9.1.5.6 1.2.12.1	9 11 10 18	48		
2		8.5.4.1 9.10.7.6 9.9.3.5 9.8.3.1	11 21 13 3	48		
3		8.4.22.2 9.10.2.2 9.4.2.2 9.1.4.4 9.1.4.2	17 15 7 8 4	51		
4		5.2.1.3 9.1.1.1 9.1.5.4 9.1.5.4 9.10.1.3	18 6 8 8 17	57		
5		2.4.6.2	45	45		
6		8.8.7.2 9.4.1.3 9.1.1.1 9.9.5.8 9.2.1.4	21 12 6 17 13	69		
7		7.4.2.3 9.1.3.1 9.9.3.5	12 2 13	27		
8		8.6.4.4 9.10.10.4 9.10.3.5 9.1.3.1	15 15 15 2	47		
9		1.1.6.4 9.12.1.5 9.1.5.3	10 6 6	22		
10		8.7.4.2 9.1.3.3 9.1.2.6 9.9.3.7	14 6 12 16	48		
11						
12						

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Item	Score
Sound	

Item	Yes/No
Pilot/Panel	

Item	Score
Air Space Control	

TOTAL K = 462

pilot

A/C Type

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Sound Score

- The sound presentation will be scored on a scale of 10 to 0 with 10 denoting “Very Quiet,” and 0 denoting “Very noisy.”
- Whole points will be used for scoring.
- K value varies according to Class.
- Mind consistency by grouping sound levels in your mind: ‘High - 10’, ‘Medium - 8’, ‘Low - 5’, ‘Unacceptable - 3’.
- If a pilot receives a sound score of three (3) or less for the same sequence from two or more judges, the pilot will be notified of the problem and will be requested by the Contest Director to adjust or modify the aircraft in order to reduce the sound level prior to the next round.

Pilot/Panel

- Pilot and Panel either are on board or not. Therefore the vote can be either 1 or 0.
- The quality of the Pilot and Panel is not evaluated
- K factor varies according to flown Class. Lower for Basic, Higher for Unlimited.

Air Space Control

- The pilot shall position the flight in a manner that allow the figures to be optimally judged.

- The HIGHEST standard for Airspace control:
  - The pilot that exhibits a significant ability to control the location of the aircraft inside the Airspace relative to the Judges, employs a tight footprint, and locates the aircraft such that it can be optimally judged at all times should receive a TEN (10).

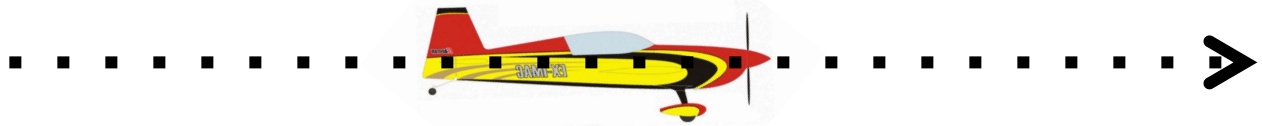
Air Space Control

- The LOWEST standard for Airspace control:
  The pilot that exhibits a poor ability to control the location of the aircraft inside the Airspace relative to the Judges, displays an excessively large footprint and has the aircraft consistently so far away as to be difficult to properly judge.
  - This pilot exhibits a very poor Airspace control and should receive a zero (0).
  - Pilots exhibiting Airspace control within the range of these two standards will be graded with a range of possible scores from ten (10) to zero (0) in whole point increments.

- K factors for the Airspace Control Scores are:
  Basic……3K, Sportsman……6K, Intermediate…..9K ,
  Advanced….12K, Unlimited……15K

Flight Path

- Picture the aircraft as condensed to a dot. Each dot is the airplane CG moving forward = Flight Path. This is the flight-path or track of the aircraft's center of gravity.



- Judging flight path consists of comparing the observed path with fixed references such as the horizon or the airspace' X and Y axis.

- Flight path must be ***Horizontal***, ***Vertical***, or on a ***45° line***.
  - Exception: Turns - horizontal path is constantly changing but vertical path remains unchanged.

Aircraft Attitude

- Specific position of the aircraft in yaw, pitch, and roll axis.
- In no-wind conditions, attitude and flight path will typically be the same. In wind conditions, attitude varies to maintain the correct flight path.
- Speed changes also effect attitude in relation to flight path.

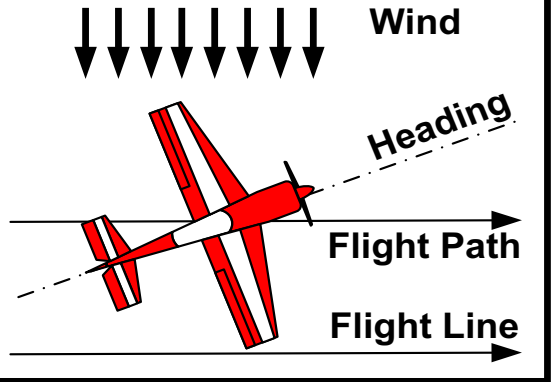


Fig. 2

Cross winds will force the aircraft to 'crab' or change its attitude in order to maintain a flight path parralel to the flight line.

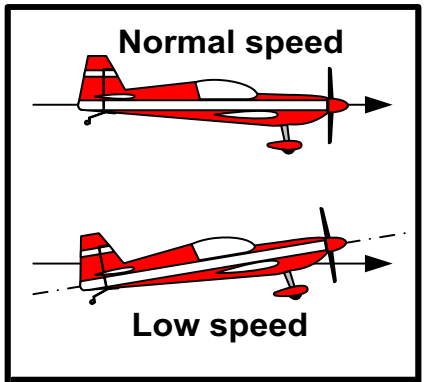


Fig. 3

At normal speed, the attitude is similar to the flight path. When the speed is reduced, the attitude may change to maintain a constant flight path.

Wind Correction

- Judges should ignore attitude changes required to maintain proper flight path. Changes not related to wind correction are deducted at ***½ pts per 5 degrees deviation***.
- Aircraft must remain in a wings-level attitude while wind-correcting in the ***pitch and yaw axis***.
- Wind correction is to be employed throughout the airspace.
- Drift observed on any line (horizontal, vertical, or 45 degrees) is downgraded at ***½ pt per 5 degrees deviation***.

Wind Correction .1

Vertical lines must be wind corrected.

No Wind - Path and Attitude are both Vertical

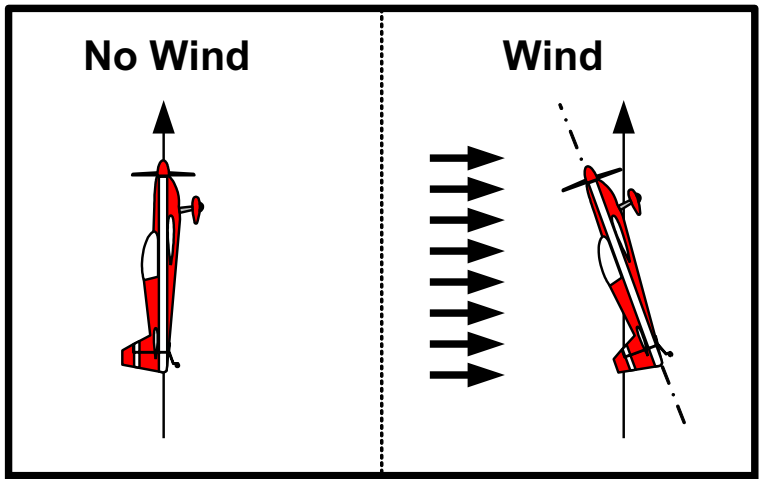


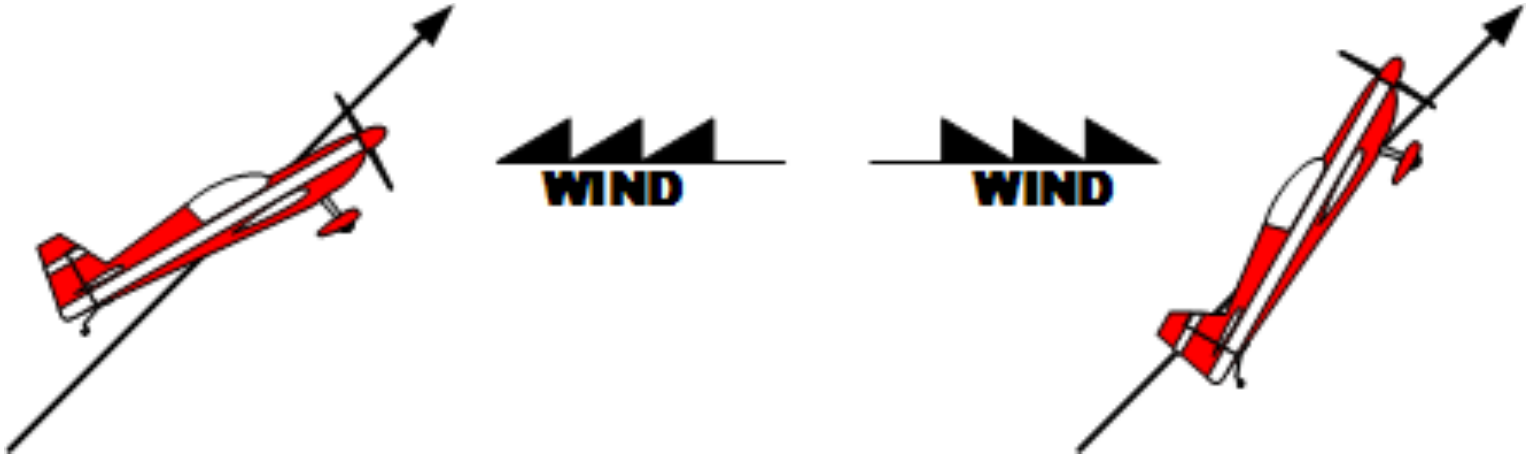
Fig. 4

For a vertical line with a wind parallel to the flight line, the aircraft attitude must be angled in order to maintain a constant flight path.

Wind - Path is Vertical and Attitude is wind corrected.

Wind Correction .2

45° lines must be wind corrected



Wind Correction .3

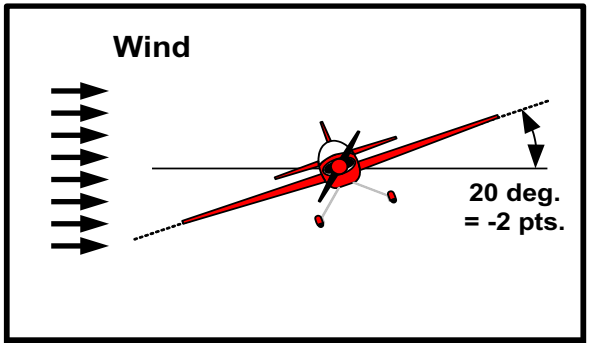


Fig. 5

In a cross wind situation, only the yaw axis is to be used for wind correction. Any change in the roll axis should not be considered wind correction and must be downgraded

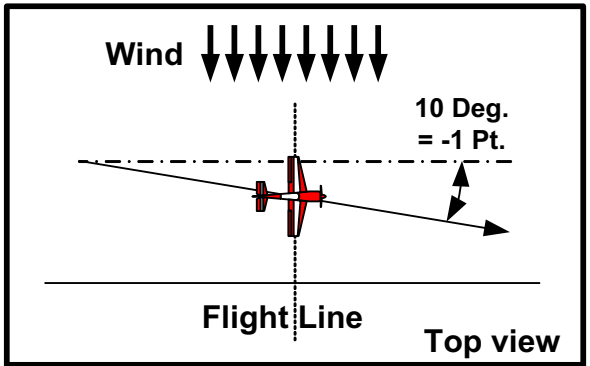


Fig. 6

Drift on horizontal line, due to cross wind should be penalized by ½ pt. per 5° deviation.

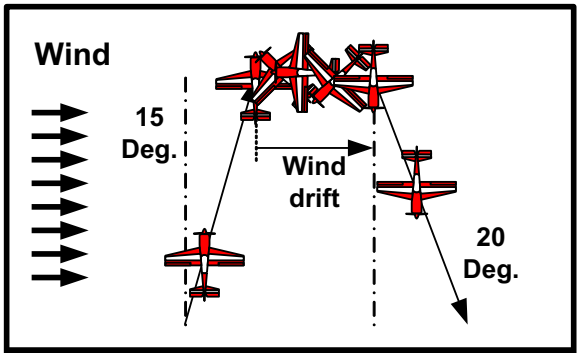


Fig. 7

In the case of a cross wind hammerhead, the above maneuver should not receive more than a 6.5 score (no downgrade for wind drift while stalled).

5° = ½ point

5° = 1/2 point

So, what does 5° look like?

Remember that 1 minute on a clock = 6°.
Most judges actually ***underestimate*** angular error.

Stall Exceptions

- Aircraft in a stall position cannot be wind corrected: no deductions.

- Wind drift to be disregarded only during the stalled portion.

  - **Stall Turn**
  - **Tail Slide**
  - **Spin**
  - **Snap Roll**

Grading Principles

- ***(10) to zero (0) in increments of one-half (0.5) point***. Deductions are graded at .5 points per 5 degrees angular error and roll error.

- The grading criteria of each component will apply in a combination figure so that one overall grade for the figure will result.

- The length of the lines and the size of the radii caused by the flying characteristics of an aircraft are not to be taken into account in the grading.

- Speed of aircraft is not a criterion. A reduction of grade will be applied for each deviation from the prescribed criteria for the figure. The grade will be reduced by 1/2 point for each 5 degrees of deviation.

Zero

- Omitting a programmed figure.
- Flying a figure that deviates from the Aresti.
- Adding a figure to the program except when necessary to reposition (Corrective maneuver) (Break Penalty will be assessed)
- BREAK in the sequence. (Disorientation etc)
- Flying a figure in wrong direction (X-axis). Y-axis is non directional.
- Cumulative deviation on roll, pitch or yaw axis > 90°.
- Any maneuver flown, even partially, behind the deadline.
- Hammerhead fly over – pivot > 4 wingspans
- No visible slide on a Tailslide
- No stall (break in correct direction) in snap rolls
- No stall on spin entry

Break in the Sequence

Zero on first wrong maneuver + Break penalty on re-entry

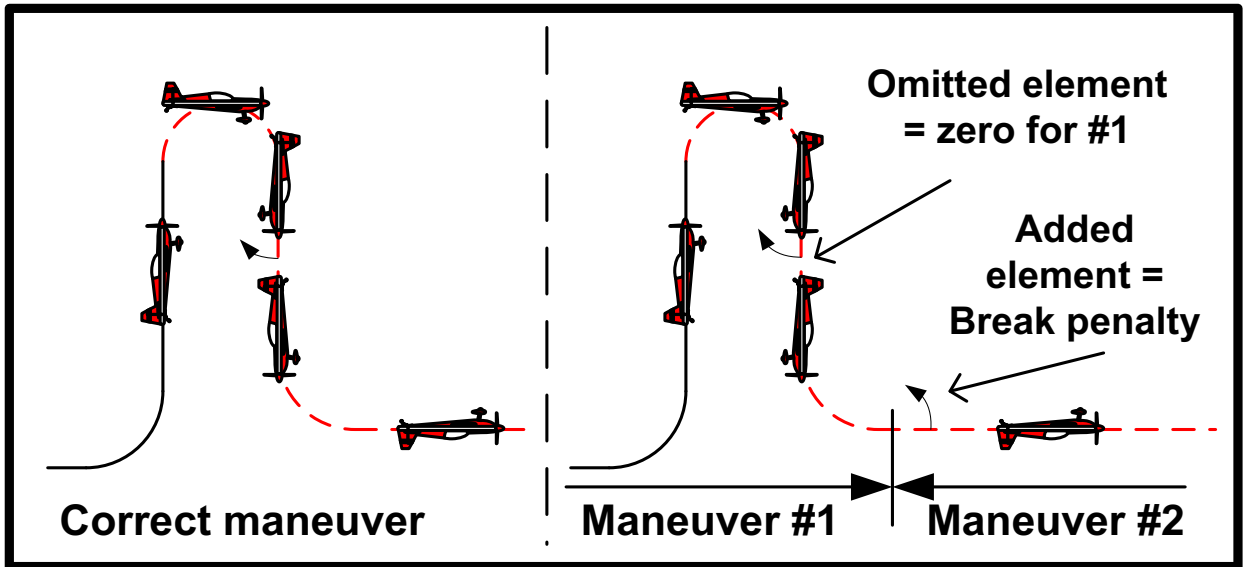


Fig. 9

If part of the maneuver is either omitted or added, all of maneuver #1 must be zeroed. The half roll performed after the end of maneuver #1 will cause a break penalty. Maneuver #2 will be judged.

Break in the Sequence

Zero on first and second wrong maneuvers + Break penalty on re-entry

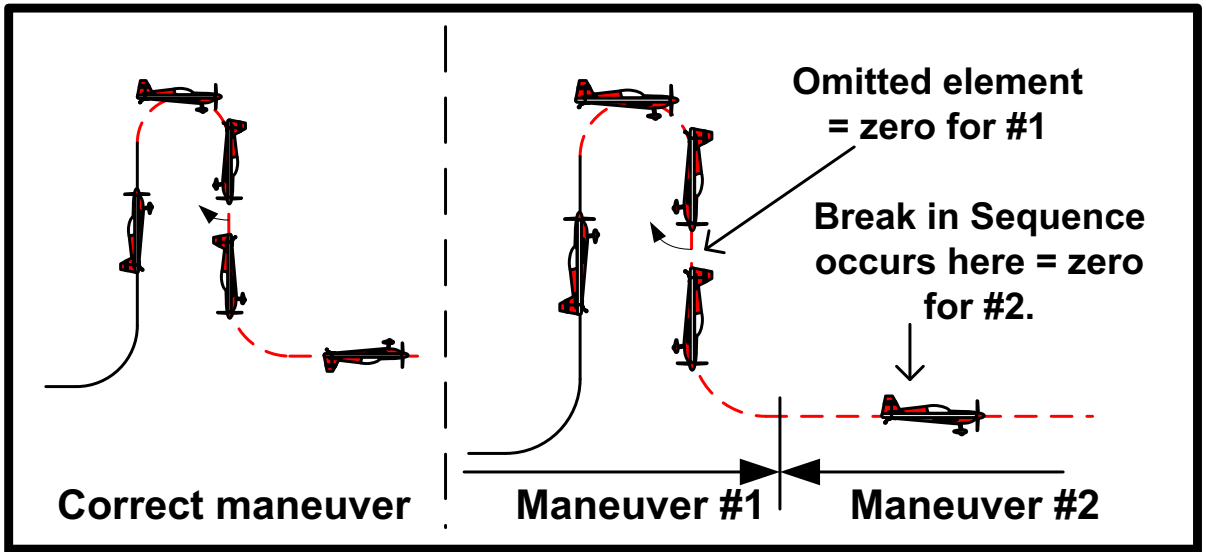


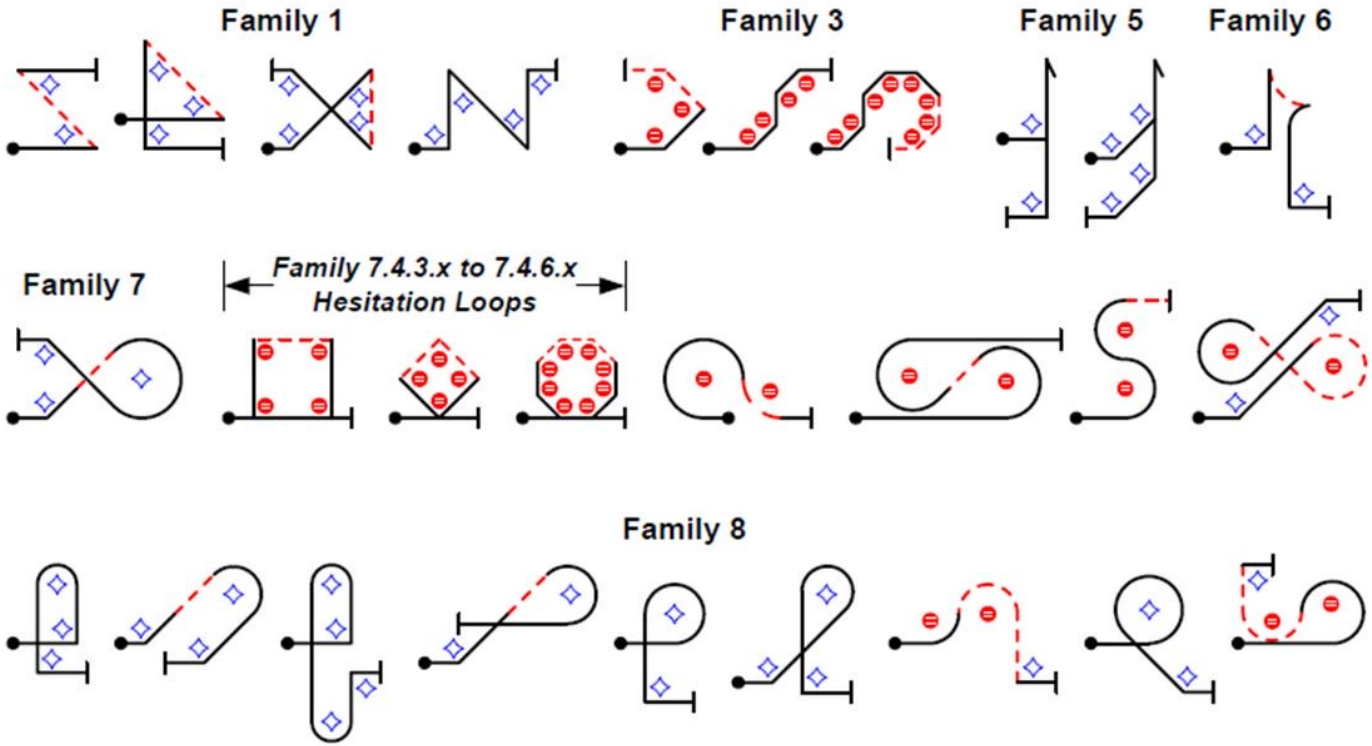
Fig. 10

If part of the maneuver is either omitted or added, all of maneuver #1 must be zeroed. IF a Break in Sequence occurs at the start of #2, it is a zero and re-fly #2 on re-entry of sequence.

Radii

Shown below is a range of examples selected from all of the affected Families. Note the different treatment for Family 3 and the Family 7.4 Hesitation loops.

- These corners and looping segments must have a constant and smooth radius, but they do ***not*** need to match any other radius in the same figure.
- These corners and looping segments must have a constant and smooth radius that are **identical in size**, or the figure must receive an appropriate downgrade.



Note that the examples above only show some of the affected figures. The principle, however, applies to all figures in the catalogue with more than one part-loop.

Judging Part-Loop Radii

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Agenda .D

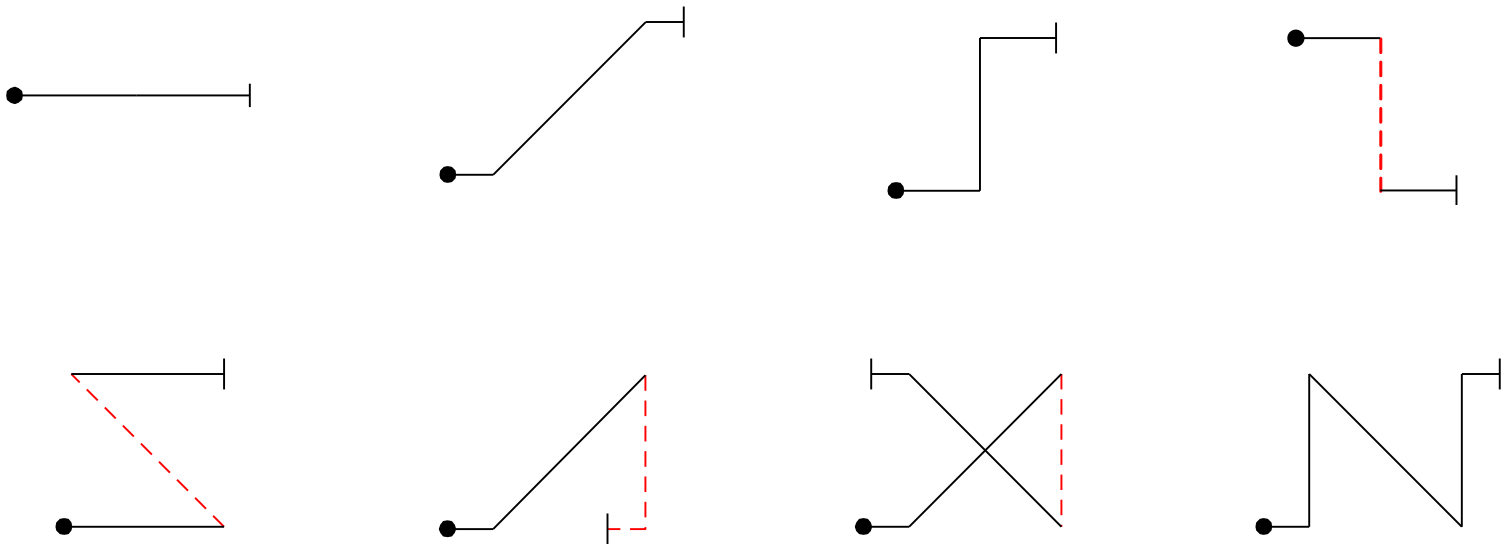
Specific Judging Criteria by Aresti Family

Nine Aresti Families

- Family 1 – Lines & Angles
- Family 2 – Turns & Rolling Turns
- Family 3 – Combinations of Lines
- Family 5 – Stall Turns – Hammerheads
- Family 6 – Tail Slides
- Family 7 – Loops
- Family 8 – Combinations of Lines, Loops, & Rolls
- Family 9 – Rotational Elements

Lines and Angles

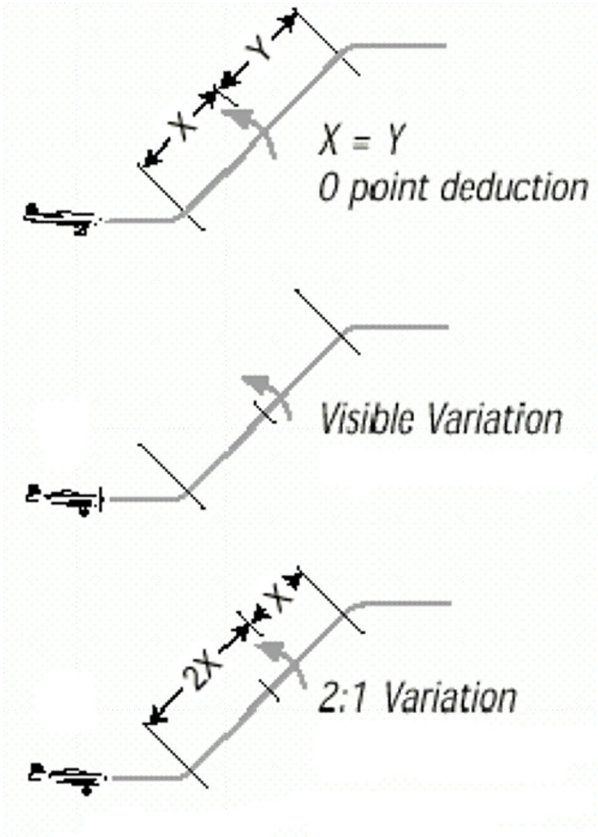
Family 1



Lines and Angles .1

Family 1

Deductions for segments length
Segment before and after roll execution.



0 points – centered = equal segments lenght

1 point - visible variation

2 points - 2:1 variation

3 points - greater than 2:1 variation

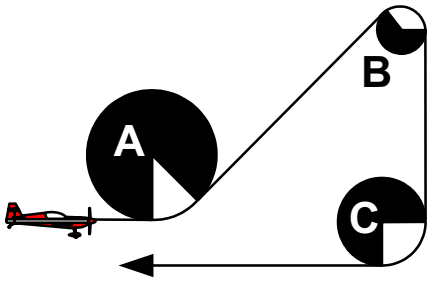
4 points – no segment before ***OR*** after roll

2 points – no segment before ***AND*** after roll

Lines and Angles .2

Family 1

Radii size and line length.



a <> b <> c

- Radii need ***NOT*** be equal -- ***NO*** downgrade if not equal.
- Lines not on flight path, - ½ point per 5°.
- If present, rolls must be centered: -1 to -4 pts.
- Exit altitude may be higher or lower than entry altitude.

Lines and Angles .3

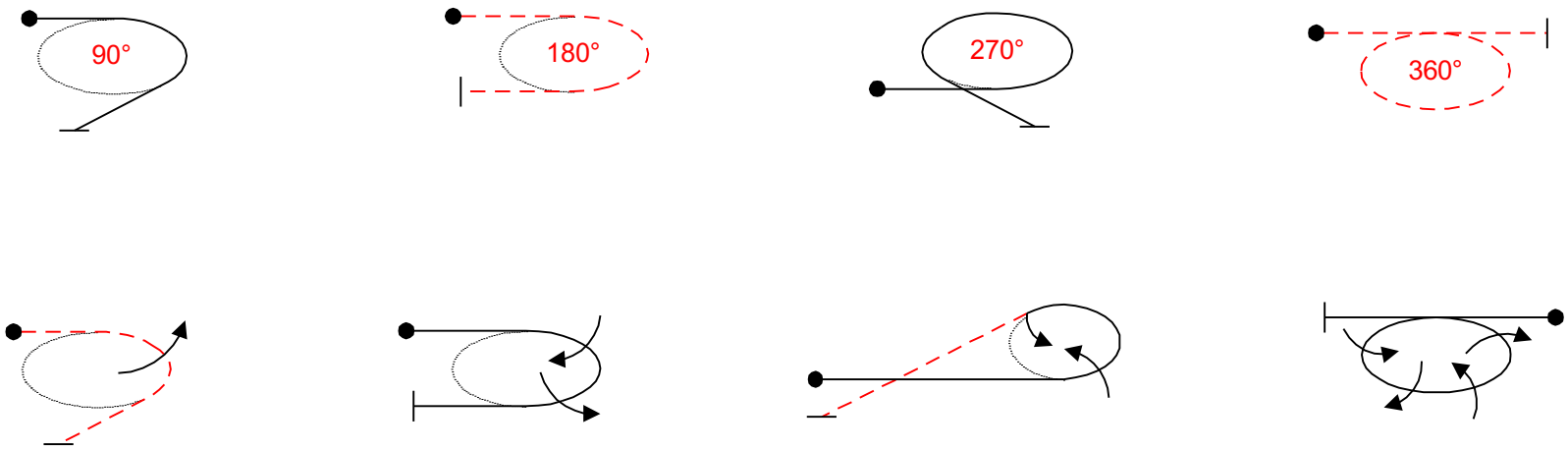
Family 1

Attention Focus.

- Track/Flight Path deviation .
- Roll elements centered.
- Distinct horizontal lines between figures of one fuselage length or more.
- Figure part loops do ***NOT*** have to be same radius.
- Cumulative grading criteria of each component.
- Any deviation of more than 90° will result in a zero.
- Length of lines is ***NOT*** a grading criterion.
- Size of loops and part loops is ***NOT*** a grading criterion.

Turns & Rolling Turns

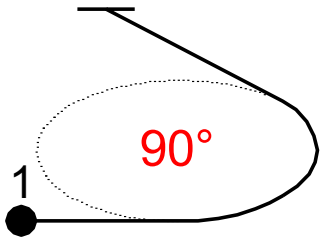
Family 2



Turns & Rolling Turns .1

Family 2

Turns

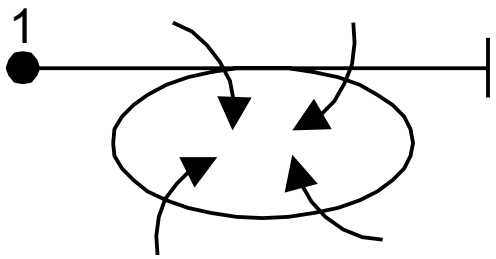


- Minimum bank angle of ***60°,*** maximum of ***90°***.
- Roll first, turn to heading, roll back to horizontal.
- Rate of roll in determines rate of roll out: - 1 point per error.
- Constant rate of turn: - 1 point per variation.
- Constant altitude: - ½ point per 5°.

Turns & Rolling Turns .2

Family 2

Rolling Turns



- Constant rate of roll: - 1 point per occurrence.
- No stoppage: - 1 point per occurrence.
- Constant rate of turn: - 1 point per occurrence.
- Constant altitude : - ½ point per 5°.
- In opposite rolls, roll must be completed before reversal.
- Minimal pause, as in hesitation rolls, between opposite rolls.
- Correct number and direction of rolls --- Zero if incorrect.

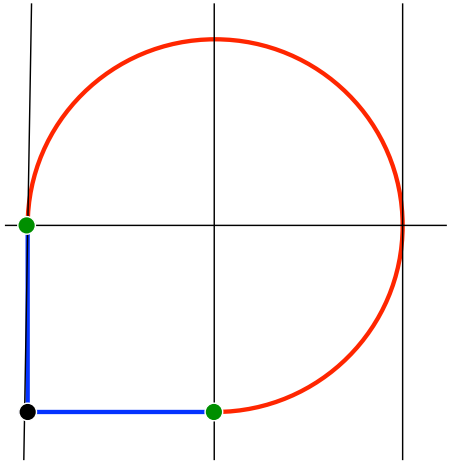
Turns & Rolling Turns .3

Family 2

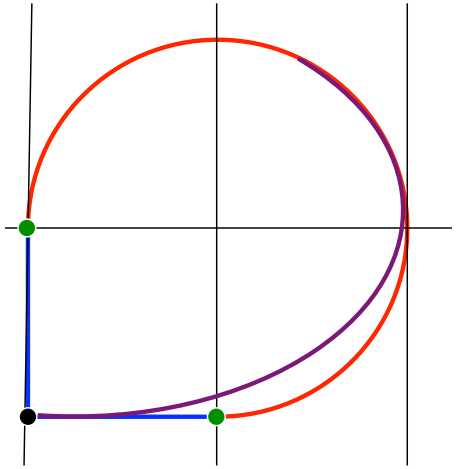
270° Rolling Turn Geometry

- If entry and exit of a 270° turn happen on the same ‘Y’ line then the turn was not round.
- Exit must always be 1 Radii distant from entry ‘Y’ line, to the right or the left.
- At least -3pt. if not.

Right

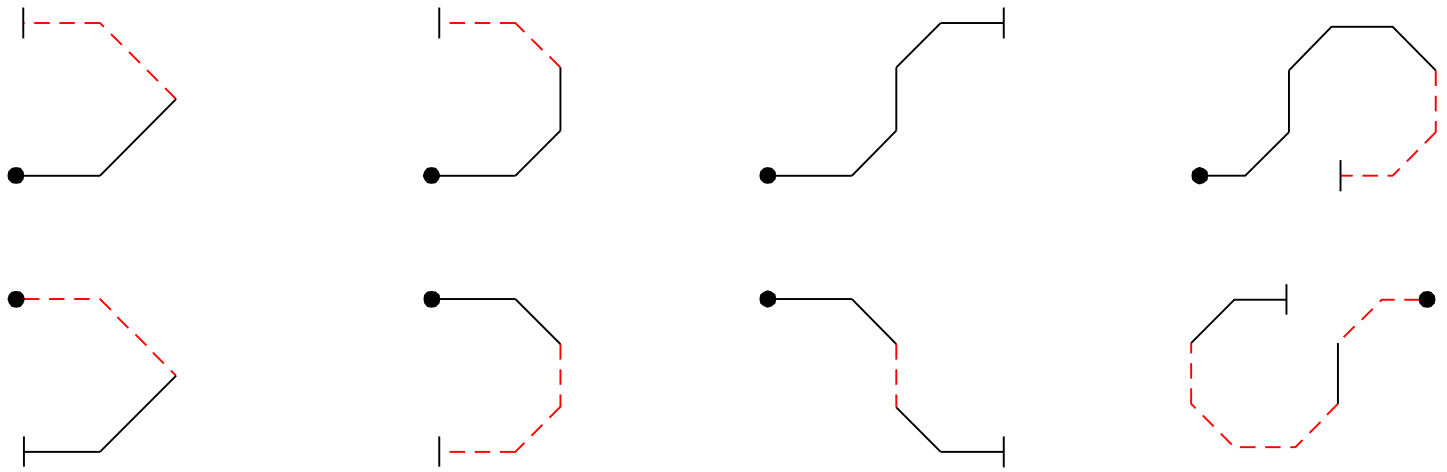


Wrong



Combination of Lines

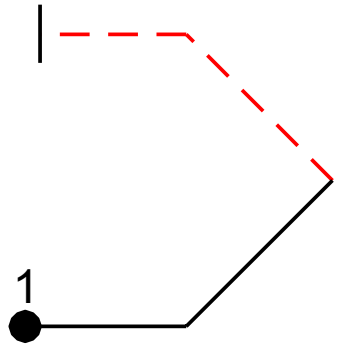
Family 3



Combination of Lines .1

Family 3

Connected lines may originate a maneuver

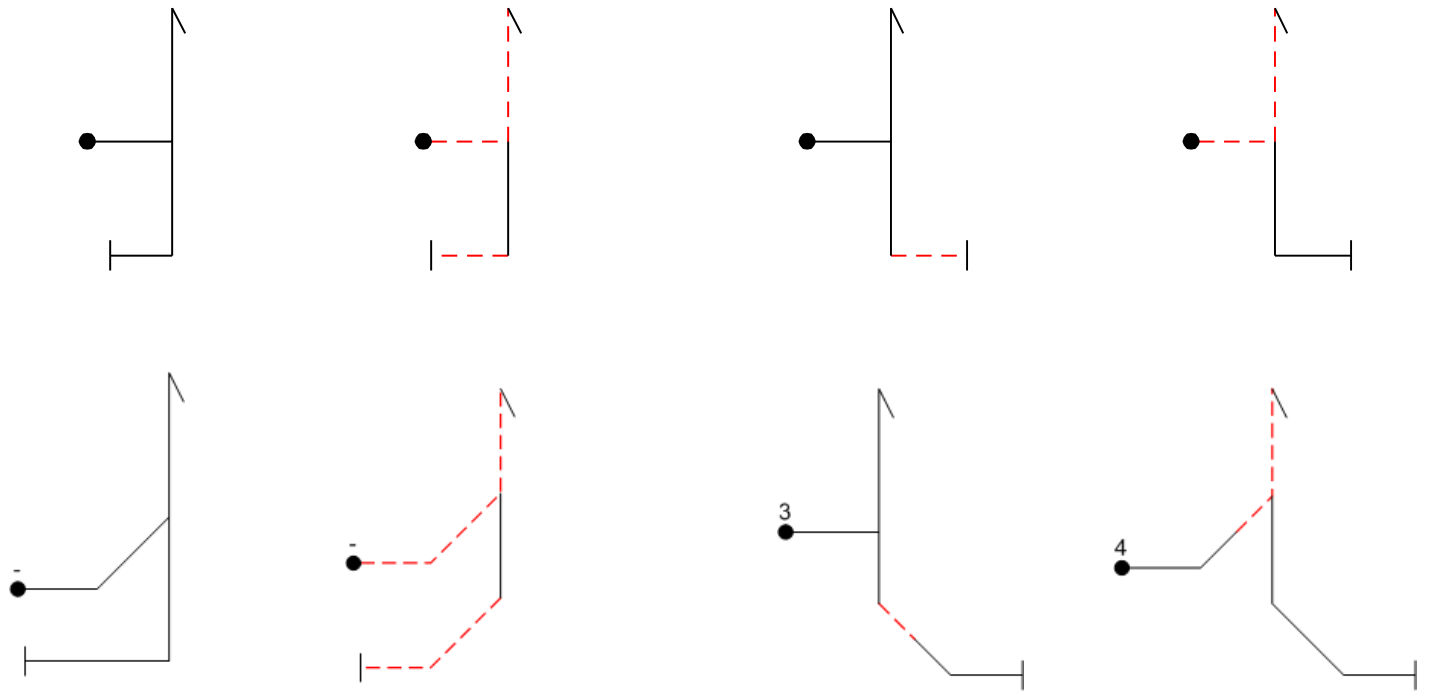


- Part loop radii must be equal, - 1 point for each radius that is different from the first part loop.
- Lines within the figure must be equal in length.
- The first line establishes the length of the rest.
- Lines judged on flight path: - ½ point per 5°

Stall Turns

Family 5

Two Lines, Three Lines, Four Lines



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Stall Turns .1

Family 5

- Radii of 1/8 & ¼ loops ***DO NOT*** have to match.
- Radii must be smooth and constant - Loop Rules apply
- The up and down lines, vertical or 45 degree, must be wind corrected so that they are flown as a straight line at the correct angle to the horizon: - ½ point per 5°
- Lines ***before and after*** any rolls must be equal: -1 to -4 pts (Figure 14)
- Any pendulum movement observed after the pivot is subject to downgrade using the (½) point per (5°) rule.

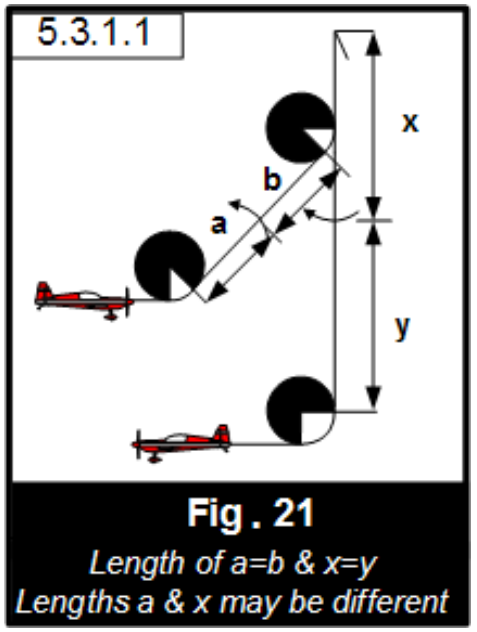
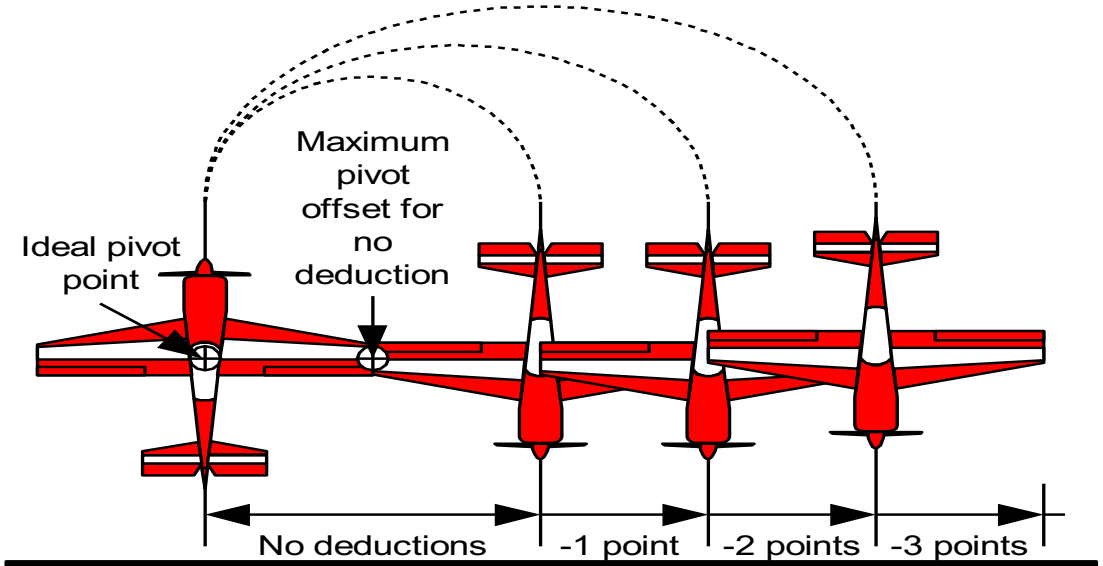


Fig . 21
Length of a=b & x=y
Lengths a & x may be different

Stall Turns .2

Family 5

Aircraft should pivot no farther away than the wingtip while maintaining a vertical plane: - ½ point per 5° for "torqueing off" the top (>90° = zero).



Deduct 1 point per 1/2 wingspan over the maximum offset point.

Stall Turns .3

Family 5

Zeros, Line Length, Entry and Exit Altitude

- Zero if aircraft “flops”,
- Zero if “flyover” (Going up/horizontal +4 wingspans),
- Zero if any visible backward movement prior to pivot - aircraft “slides.”
- Length of line is ***NOT*** a grading criterion.
- Entry and exit altitude can be different.

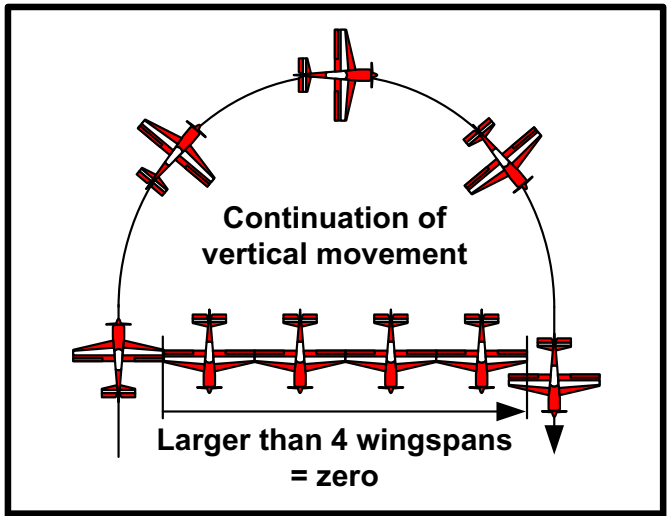


Fig. 23

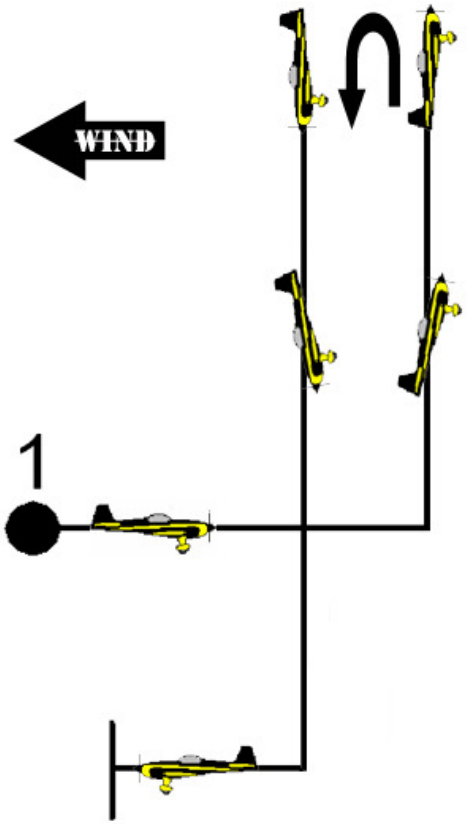
'Fly-over' is characterized by the continuation of vertical movement and a pivot larger than 4 wingspans.

Stall Turns .4

Family 5

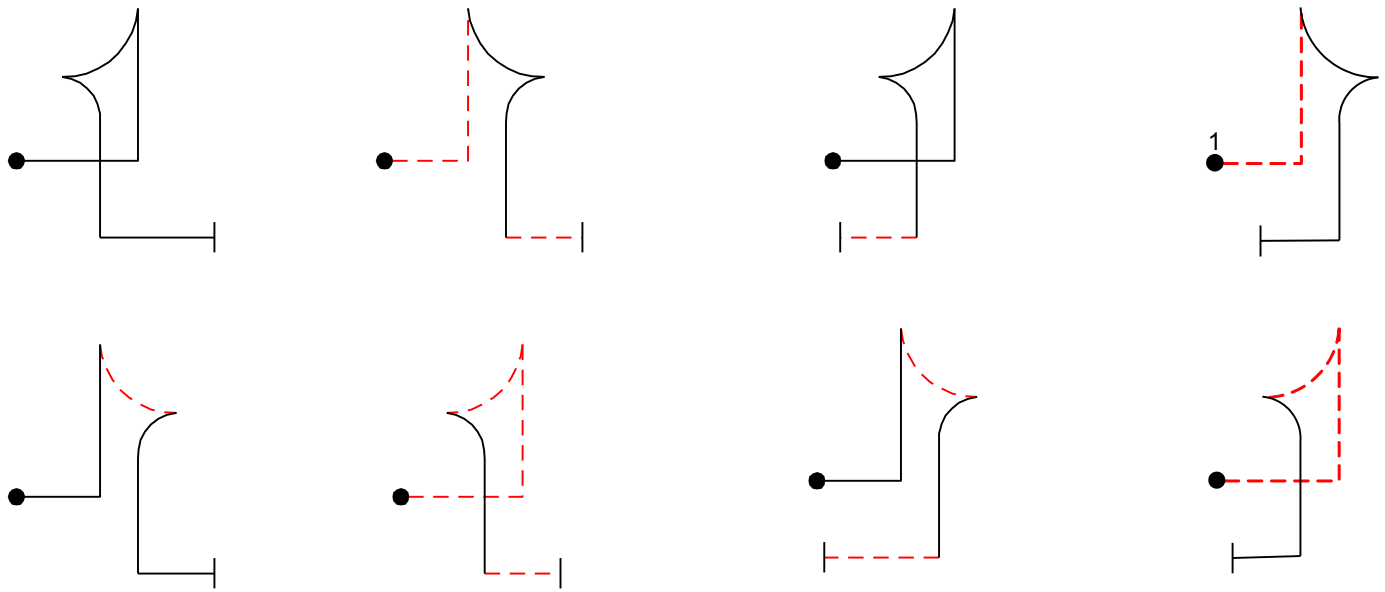
Wind Control

- From level flight, aircraft establishes wind-corrected vertical line
- As the aircraft approaches the stall, transitions to perfectly vertical in the ***PITCH*** axis only
- During pivot, only yaw should be present, and the aircraft may be displaced due to wind (***no downgrade***)
- Immediately after completing the turnaround and establishing flying speed, wind correction is reapplied
- Aircraft pulls out to level – entry radius and exit radius can be different (***no downgrade)***



Tail Slides

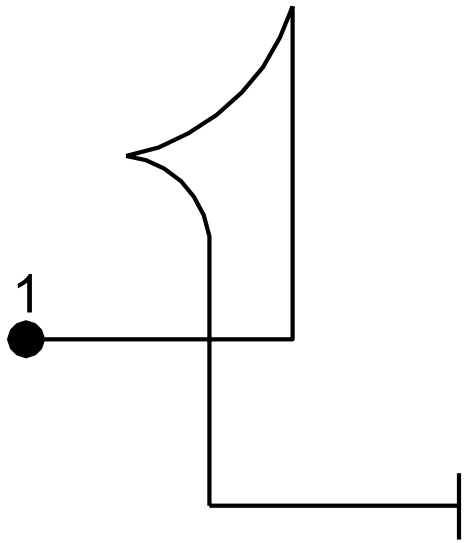
Family 6



Tail Slides .1

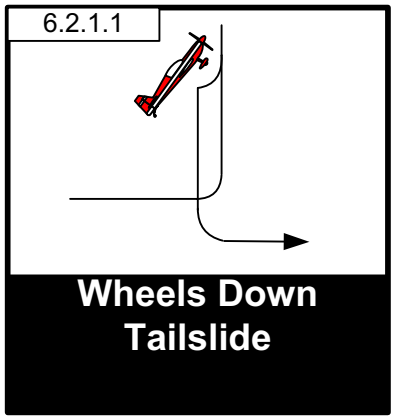
Family 6

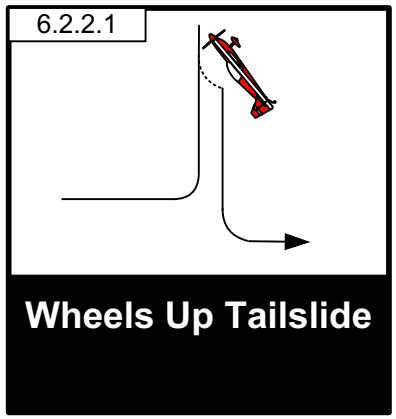
- ¼ loop radii ***DO NOT*** have to match.
  - Radii must be smooth and constant. - Loop Rules apply.
- Track up and down must be vertical:
  - ½ point per 5°
- Lines ***before and after*** any rolls must be equal:
  - -1 to -4 pts. (Segment Rule)
- Aircraft must slide backwards ***a visible amount.***
- Zero if no backward movement (***watch the tail***). Always give the competitor the benefit of the doubt.

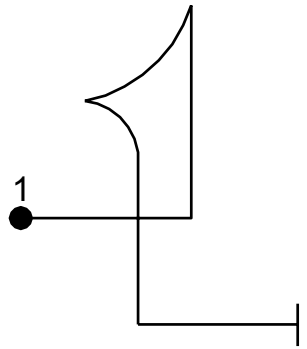


Tail Slides .2

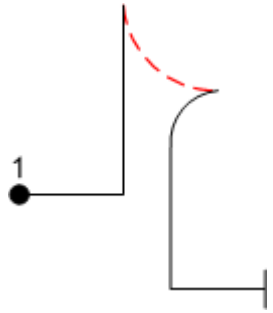
Family 6







- Aircraft must fall in right direction (wheels up/down).
  - Zero if wrong direction
- Aircraft must fall with wings level in correct plane
  - ½ point per 5°
- No downgrade for pendulum after slide.
  (However aircraft ***must*** re-establish vertical down line)
- Same entry/exit altitude is ***NOT*** a grading criterion



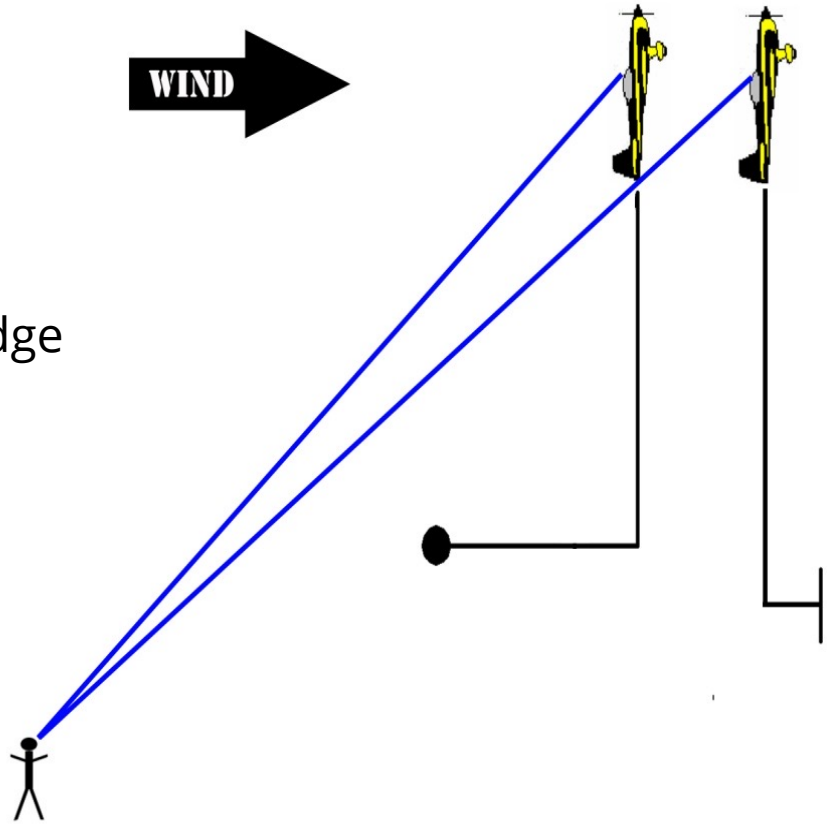
Tail Slides .3

Family 6

Wind Control

Downwind Tail Slide

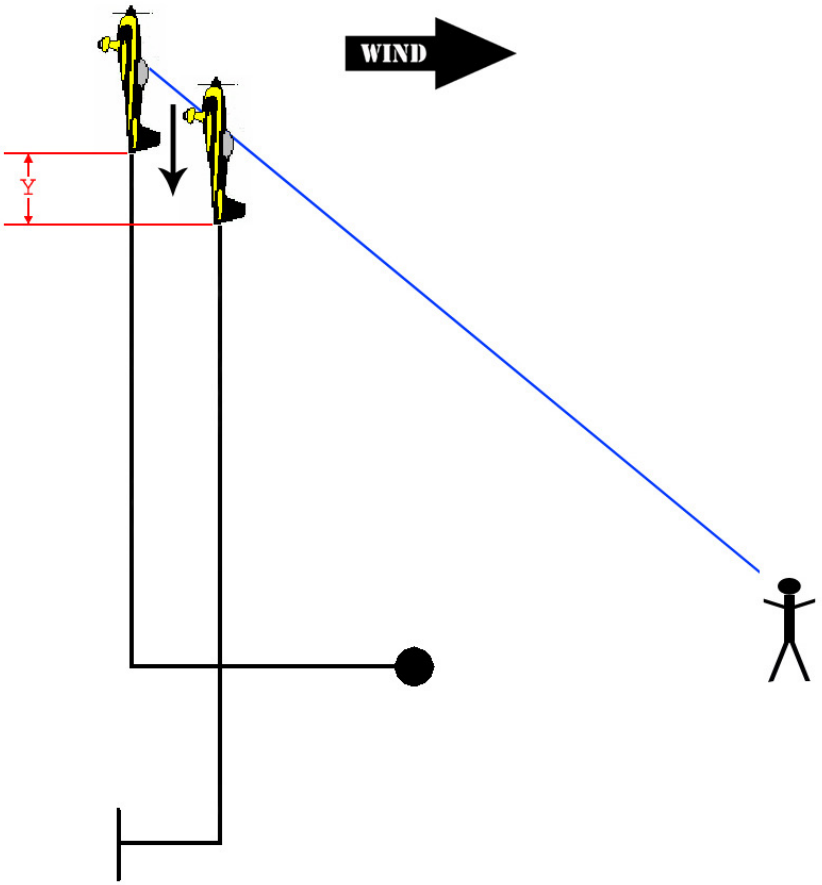
Horizontal wind drift ***away*** from the judge can appear as backwards slide, even if none is present due to a change in viewing angle



Tail Slides .4

Family 6

Wind Control



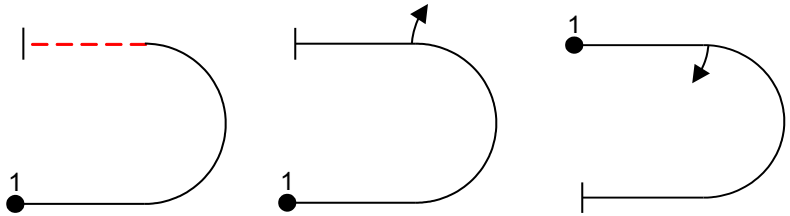
Upwind Tail Slide

Wind drift ***towards*** the judge can actually hide a true backwards displacement if the viewing angle changes very little from the judge's perspective

Loops

Family 7

Immelmann & Split S



- Any lateral displacement: -½ point per 5°
- Any variation in radius: -1 point per occurrence
- Any Roll displacement (other than during a roll element on the loop):
  - ½ point per 5° of roll
- Flight path without any radius (straight line or "flat spot"):
  - 1 point per occurrence
- If rolls are present, there must be no visible line between the start/end of loop and roll: -2 point if visible line, could be zeroed at judges discretion if appears as two separate maneuvers.

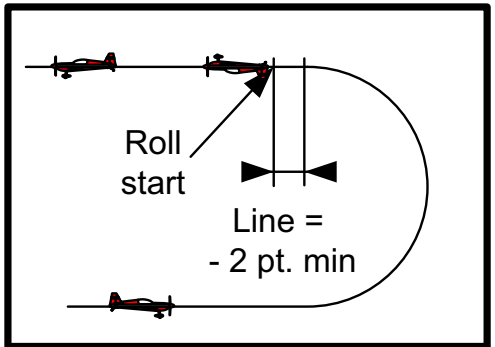
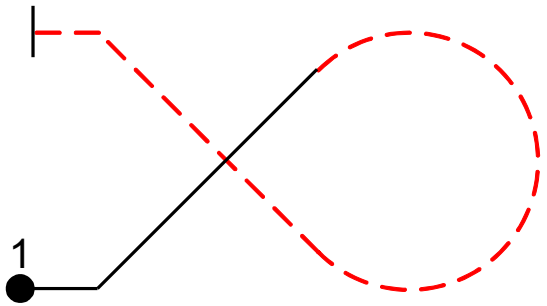


Fig. 29

Drawing a line after the 1/2 loop is a minimum downgrade of 2 points.

Loops .1

Three Quarter Loops (Goldfish)



- Entry and exit radii ***DO NOT*** have to match - All loop rules apply.
- Three Quarter Loop does ***NOT*** have to match exit or entry but must be constant. – Loop rules apply.
- Length of 45° lines is ***NOT*** a grading criterion.
- Any rolls on 45° lines must be centered: -
  - 1 point for visible variation, etc. (length of line/roll criteria)
- 45° lines are judged on track:
  - ½ point per 5°

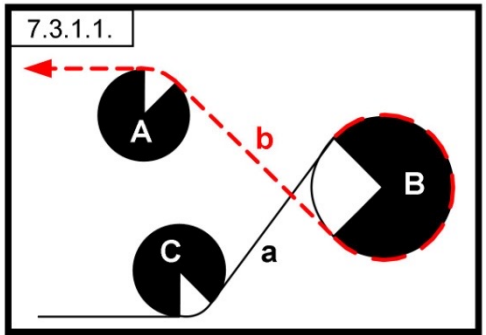
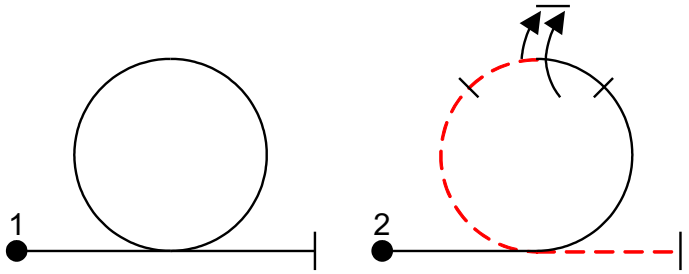


Fig. 32

Radii A - B - C may be different. Lines a and b do not have to be the same length.

Loops .2

Whole Loops



- All loop rules apply.
- Must appear perfectly round; begin and end at the same altitude.
- If there is displacement perpendicular to the flight line - ½ point per 5°.
- Radius must be constant.
  Radius changes: -1 point per occurrence.
- "Flat spot": -1 point per occurrence.
  - If rolls are present, they must be centered at apex, or centered at the bottom of the loop.
  - At least -2 points if flown on a line (not in radius).

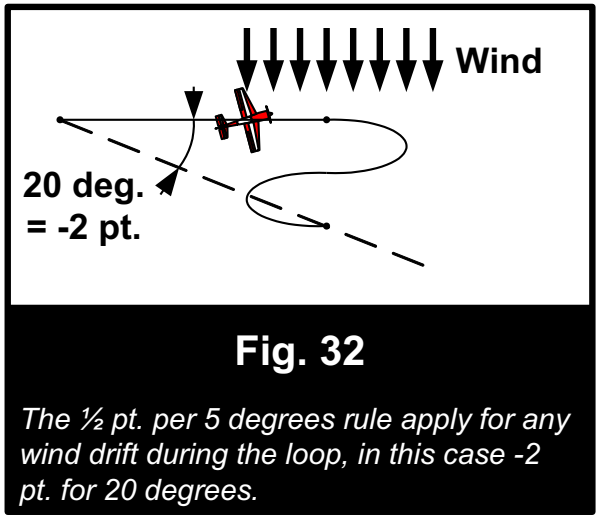
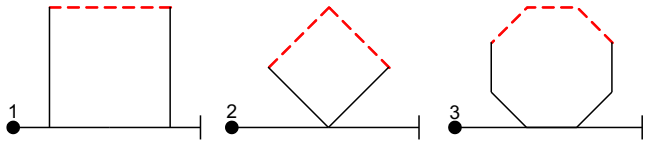


Fig. 32

The ½ pt. per 5 degrees rule apply for any wind drift during the loop, in this case -2 pt. for 20 degrees.

Loops .3

Square Loops
Diamond & Octagon



- Must begin and end at the same altitude.
- 90° and 45° lines are judged on track:
  - ½ point per 5°
- All radii must be constant and equal: - 1 point for each
- radius that is different from the first part loop.
- Loop rules apply.
- All line segments must be equal length.
- The first line sets the standard.
- If rolls are present, they must be centered on the line:
  - -1 to -4 pts (Figure 14)

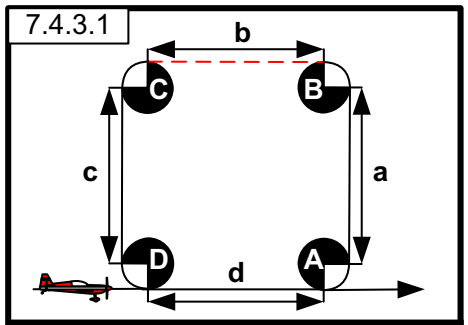


Fig. 39

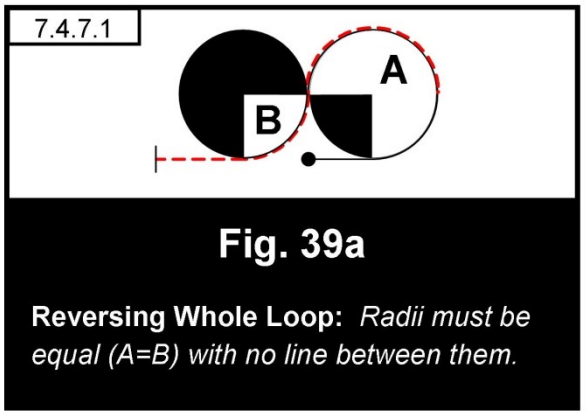
Radii A=B=C=D
Length a=b=c=d
Figure not finished until d=a

Loops .3

Family 7

Reversing Whole Loops

- Radius must be constant.
  Radius changes: -1 point per occurrence.
- Radii of all looping segments must be equal
- No line between ¼ & ¾ loop segments. A minimum
  of 2 points deduction.
- **If rolls are present, must be centered at apex. **
- -2 points if flown on a line (not in radius).



- If rolls are present on entry or exit, there must be no visible line between the start/end of loop and roll: -2 point if visible line, could be zeroed at judges discretion if appears as two separate maneuvers.

Loops .4

Family 7

Horizontal S

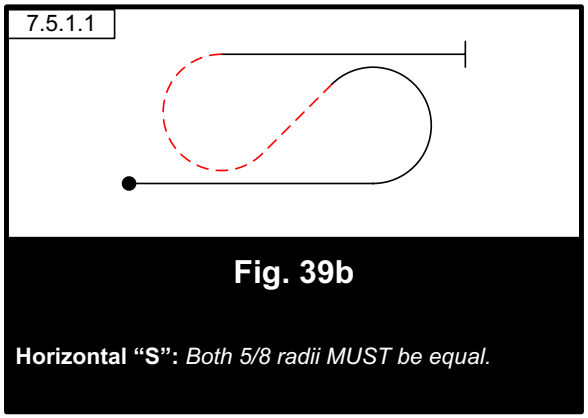


Fig. 39b

Horizontal "S": *Both 5/8 radii MUST be equal.*

- Both 5/8 radii, must be the same. (-***1 point if different).***
- All loop rules apply.
- Any rolls on 45° lines must be centered.
- 45° lines are judged on track.
- If rolls are present on the horizontal lines, there must be no visible line between the start/end of loop and roll: -2 point if visible line, more if line is extended and could be zeroed at judges discretion.

Loops .5

Vertical S

- Both half loops must ***appear*** round and of the same size.
- -1 point if the two ½ loops are different.
- -1 point for each radii change,
- “Flat spot”: -1 point per occurrence.
- Wind corrected (Vertical plane): -½ point per 5° error.
- Wings level: - ½ point per 5°.
- If half rolls are present, they must immediately follow the looping line and be flown on a horizontal line.
- No straight line may precede or follow the half roll: -2 points for visible line before or after.

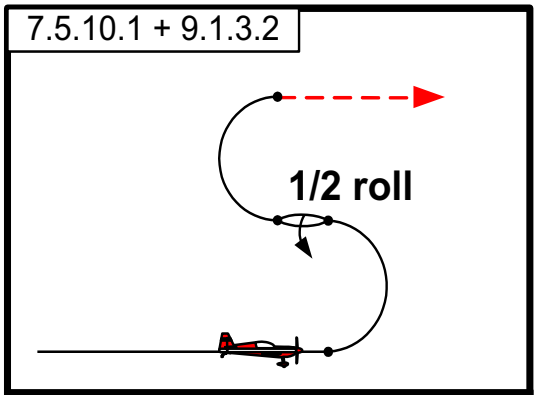


Fig. 41

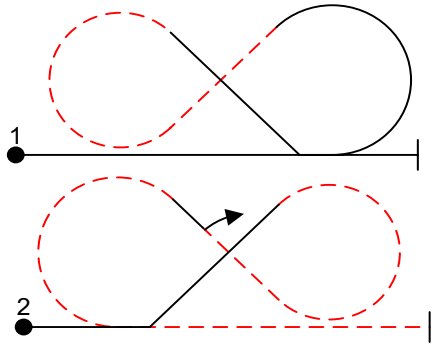
A half roll between two half loops must be flown on a horizontal line.

Loops .6

Family 7

Horizontal Eight

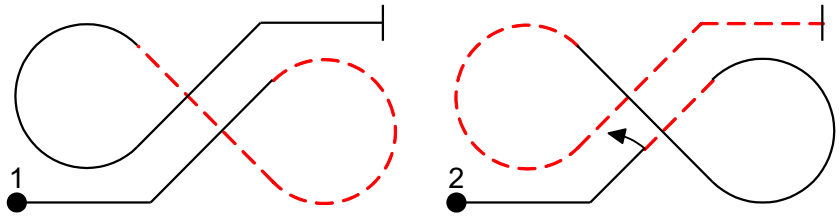
- 5/8 & ¾ Loop radii **must be the same**. - 1 point if different.
- 1/8 entry or exit radii **can be different** from 5/8 & ¾ loop radii.
- Any rolls on 45° lines must be centered:
  -1 to -4 pts. (Segments Rule)
- 45° lines are judged on track. - ½ point per 5°
- Entry and exit altitude **MUST** be the same.
- If rolls are present on entry or exit, there must be no visible line between the start/end of loop and roll: -2 point if visible line, could be zeroed at judges discretion if appears as two separate maneuvers.



Loops .7

Family 7

Horizontal Super Eight



- Contain three 45 degree lines (which can have rolls).
- 45 degree lines can be of different lengths.
- Entry and exit radii, ***DO NOT*** have to match, but must be smooth and constant - All loop rules apply.
- Both ¾ Loop radii ***must be the same, - 1 point if different.***
- Entry & exit radii can be different from ¾ loop radii.
- The two ¾ loops need NOT occur at the same altitude, nor is there any relationship between the entry/exit altitudes and the altitude limits of the ¾ loops.

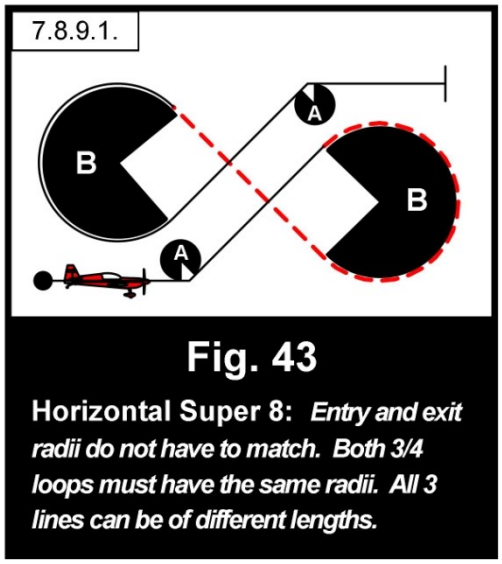


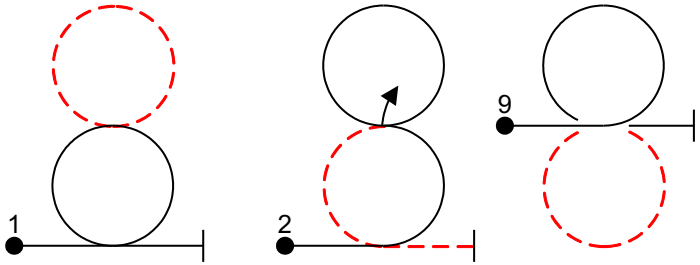
Fig. 43

Horizontal Super 8: *Entry and exit radii do not have to match. Both 3/4 loops must have the same radii. All 3 lines can be of different lengths.*

Loops .8

Family 7

Vertical Eight



- Must ***appear*** perfectly round and of the same size: 1 point for each radii change, 1 point if the two loops are not the same size.
- Must begin and end at the same altitude.
- Wind corrected (Vertical plane): -½ point per 5° error.
- Wings level: - ½ point per 5°.

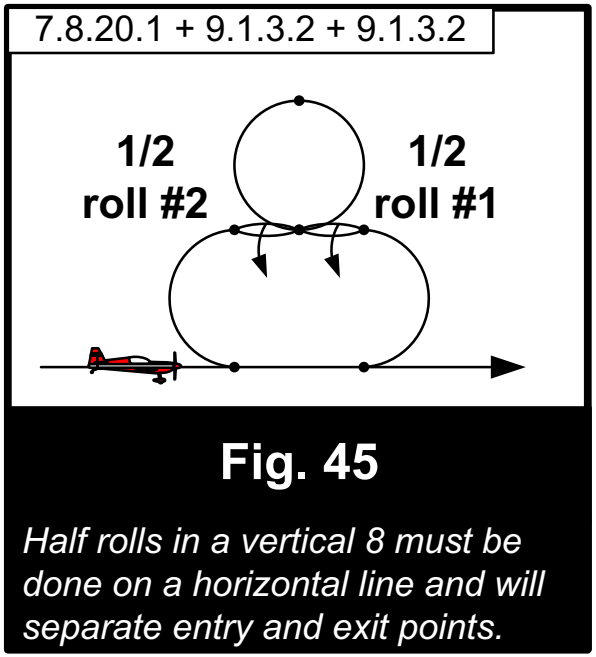


Fig. 45

Half rolls in a vertical 8 must be done on a horizontal line and will separate entry and exit points.

- If half rolls are present, they must immediately follow the looping line and be ***flown*** on a ***horizontal line***. No straight line may precede or follow the half roll: -2 points for visible line before or after.

Lines, Loops and Rolls

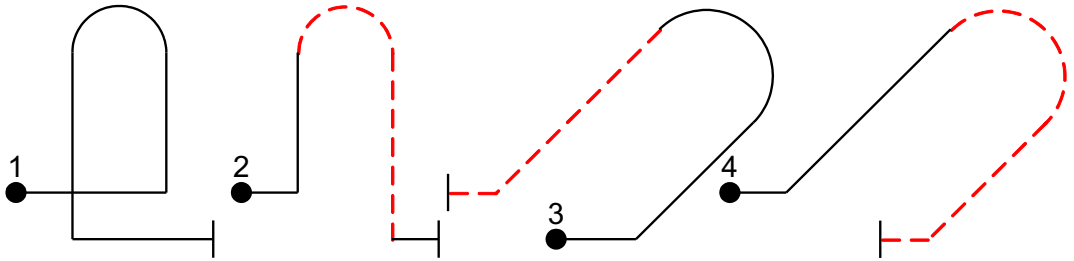
Family 8

- Humpty Bumps & Diagonal Humpty Bumps
- Half Cubans
- Vertical 5/8 loops
- “P” Loops & reversing “P” Loops
- “Q” Loops
- Double Humpty Bumps
- Reversing 1¼ Loops

Lines, Loops and Rolls .2

Family 8

Vertical and Diagonal Humpty Bumps



- Entry and exit partial loop radii ***DO NOT*** have to match.
- ½ loop must be round.
- Entry and exit altitude need ***NOT*** be the same.
- Rolls must be centered on the line(s).
- Altitude is ***NOT*** a grading criterion.
- 90° & 45° lines are judged on track.

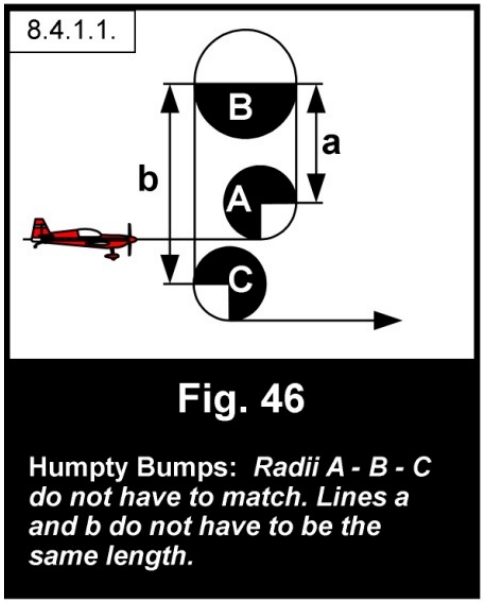


Fig. 46

Humpty Bumps: *Radii A - B - C do not have to match. Lines a and b do not have to be the same length.*

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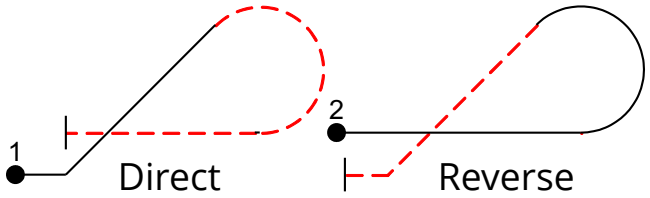
Lines, Loops and Rolls .3

Family 8

Direct and Reverse Half Cuban Eights



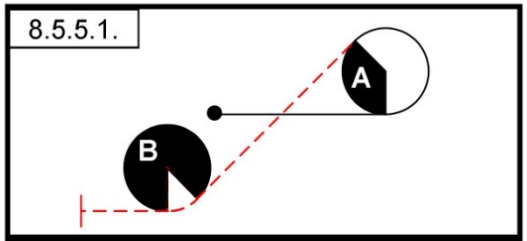


Fig. 47

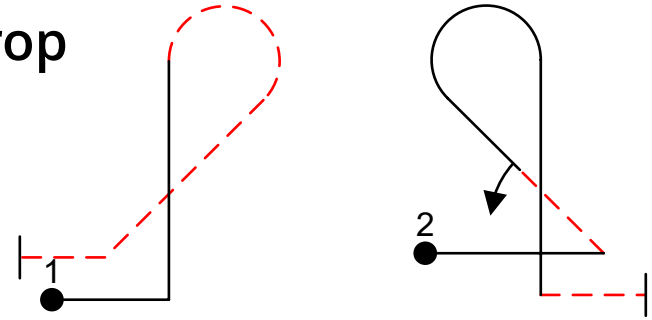
All partial loops do not have to have the same radii. A and B do not have to match.

- 1/8 loop and 5/8 loop ***DO NOT*** to be same radius.
- If present, rolls must be centered on the 45° line.
- All lines are judged on track: - ½ point per 5°
- If rolls are present on the horizontal line, there must be no visible line between the start/end of loop and roll:
  -2 point if visible line, more if line is extended.
- Entry and exit altitude need ***NOT*** be the same.

Lines, Loops and Rolls .4

Family 8

Vertical 5/8 Loop - Teardrop



- Part loops ***DO NOT*** have to be the same radii.
- If present, rolls must be centered on the 45° line and vertical line.
- 90° & 45° lines are judged on track: - ½ point per 5°
- Entry and exit altitude need ***NOT*** be the same.

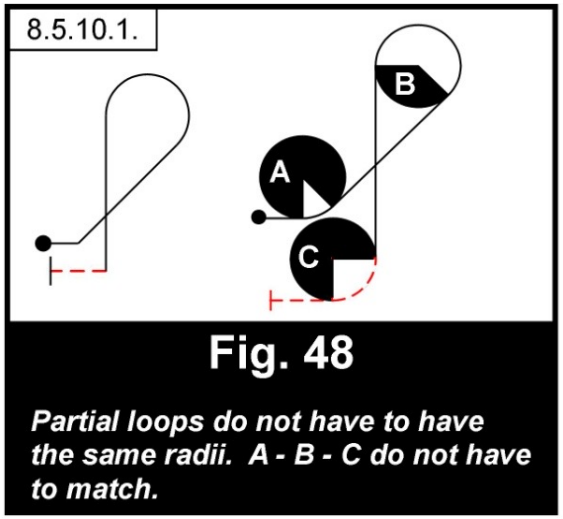


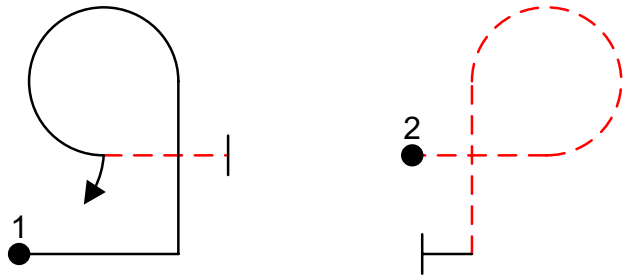
Fig. 48

Partial loops do not have to have the same radii. A - B - C do not have to match.

Lines, Loops and Rolls .5

Family 8

"P" Loops



- Radii of 3/4 & 1/4 loops ***MAY be different***.
- If roll is present on a 90° line, it must be centered.
- If roll is present, on a horizontal line, there must be no visible line between the start/end of loop and roll - 2 point if visible line, - more if line is extended
- Entry and exit altitude may ***NOT*** be the same on P Loops.

Lines, Loops and Rolls .6

Family 8

Reversing "P" Loops

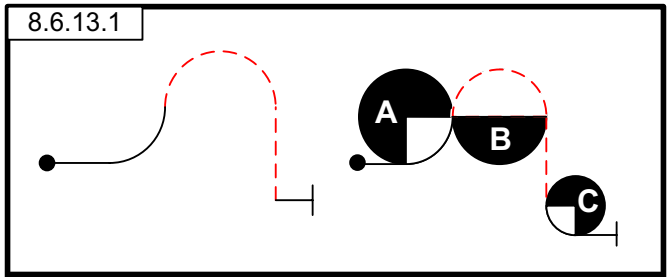


Fig. 49

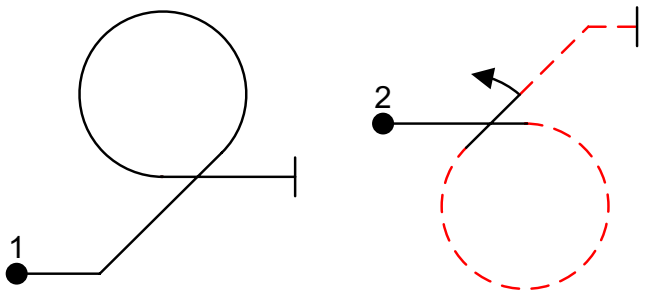
When partial loops are joined, their radii must be equal (A=B) with no line between them.
Last 1/4 loop radius (C) can be different from A and B.

- Radii of "JOINED" Multiple part loops must be equal.
  - ***1 point for each radius that is different from the first part loop.***
- Radii of "EXIT or ENTRY" ¼ loop ***need not match*** the radii of the joined loops. - Loop rules apply
- ***NO LINE between "JOINED" loops***: minimum 2 point if visible line.
- If rolls are present on the horizontal line, there must be no visible line between the start/end of loop and roll: minimum 2 point if visible line, more if line is extended.

Lines, Loops and Rolls .7

Family 8

“Q” Loops

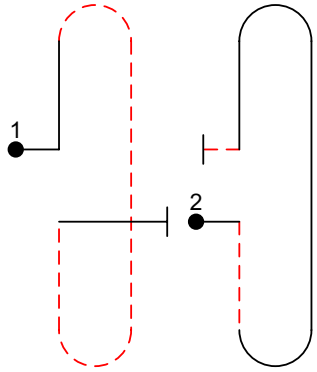


- Radii of 7/8 & 1/8 loops ***MAY be different***. - Loop rules apply.
- If roll is present on a 45° line, it must be centered.
  - -1 to -4 pts (Figure 14)
- If roll is present, on a horizontal line, there must be no visible line between the start/end of loop and roll,
  - 2 point if visible line, - more if line is extended and could be zeroed at judges discretion.
- Entry and exit altitude may ***NOT*** be the same on Q Loops.

Lines, Loops and Rolls .8

Family 8

Double Humpty Bump



- Entry and exit partial loop radii ***DO NOT*** have to be the same.
- BOTH ½ loops must be round and ***may have different radii.***
- Entry and exit altitude need ***NOT*** be the same.
- Rolls must be centered on the line(s):
- Altitude is ***NOT*** a grading criterion.
- Lines are judged on track. - ½ point per 5°

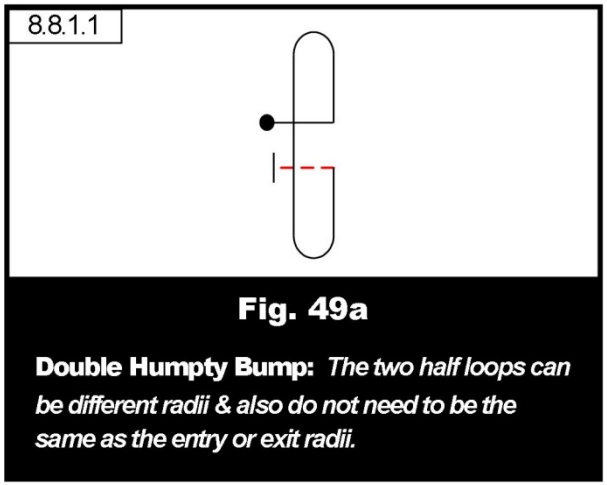


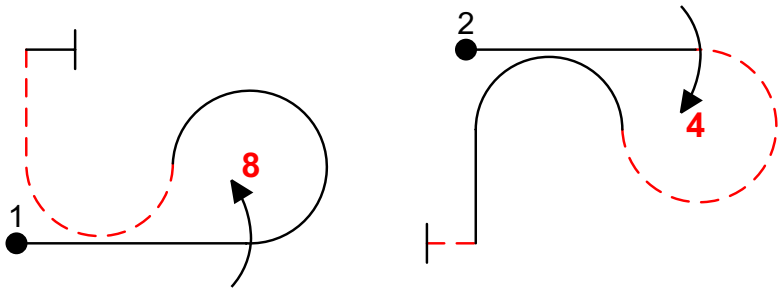
Fig. 49a

Double Humpty Bump: *The two half loops can be different radii & also do not need to be the same as the entry or exit radii.*

Lines, Loops and Rolls .9

Family 8

Lynx Eyes

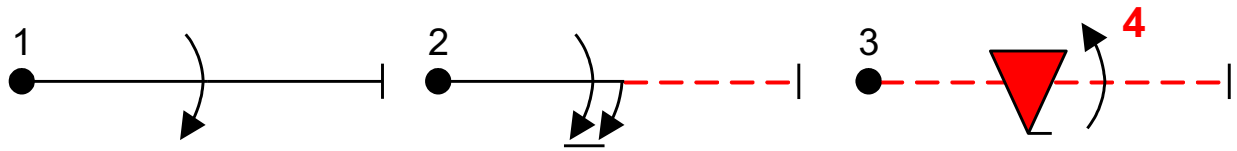


- Radii of "JOINED" Multiple part loops must be equal.
  - 1 point for each radius that is different from the first part loop.
  - ***NO LINE between "JOINED" loops***: minimum 2 point if visible line.
- Radii of "EXIT" ¼ loop ***need not match***. - Loop rules apply
- If roll is present, on a horizontal line, there must be no visible line between the start/end of loop and roll, minimum 2 point if visible line, - more if line is extended.
- Roll elements on the vertical line must be centered.

Rotational Elements

Family 9

Rolls and Point Rolls

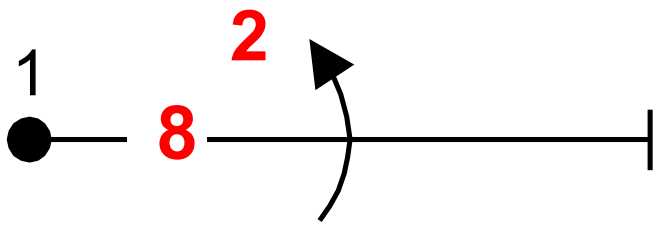


- The rate of roll must be constant: - 1point per occurrence
- Aircraft must maintain heading and prescribed plane and direction of flight during the roll: - ½ point per 5°
- Aircraft must stop precisely after stated number of rotations:
  - ½ point per 5°. An over / under rotation of greater than 90° will be zeroed.
- Linked rolls must be flown as one continuous figure.
- Unlinked and opposite rolls must have a brief, minimal pause between the rolls - Hesitation. Absence of a perceptible pause between elements of the combination shall be downgraded by 1 point.
- Roll rates ***CAN*** be different in unlinked roll elements without a downgrade.

Rotational Elements .1

Family 9

Point Rolls



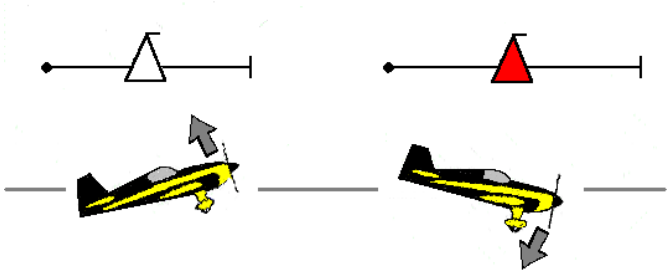
- The roll rate of the rolling segments must be constant with each roll segment matching that of the preceding segment. Any visible deviation in roll rate from one segment to the next, or within a segment, is to be downgraded by one (1) point per occurrence.
- Hesitation for points should be distinct. Each visible variation in the duration of the pause segments is downgraded by one (1) point. Errors in degrees of rotation (under / over rotating the points) are downgraded at a half (.5) point per five (5) degrees. However, the duration of the rolling segments and the pause segments need not be equal.
- If a pause is not recognizable or is omitted, the figure is graded a zero (0).

Rotational Elements .2

Family 9

Snap Rolls

Positive Snap-
Pitch toward Canopy



Negative Snap-
Pitch toward Gear

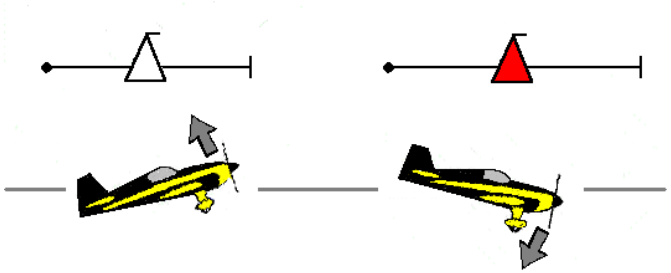
- Nose must depart flight path in the correct direction.
  - Zero if either no pitch observed or pitch in wrong direction
- Autorotation must be initiated.
  - Zero if no autorotation, roll is barreled or “aileroned”
- Departure and autorotation may occur simultaneously or sequentially.

Rotational Elements .3

Family 9

Snap Rolls .2

Positive Snap-
Pitch toward Canopy



Negative Snap-
Pitch toward Gear

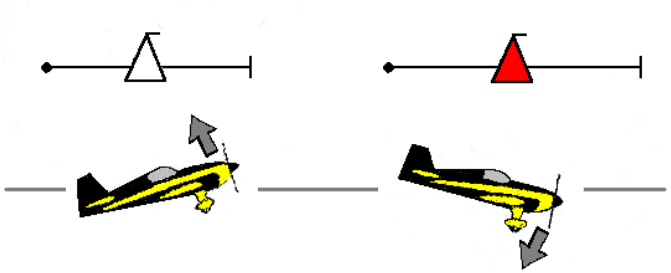
- Any rotation / roll observed prior to the required pitch movement is to be downgraded 0 .5 points for each 5 degrees of such rotation.
- Coming out of autorotation early and aileroning to the end of the snap is a common error. In this case, a downgrade of 0.5 points for each 5 degrees is to be applied for the amount of rotation remaining at the point the autorotation ends.

Rotational Elements .4

Family 9

Snap Rolls .3

Positive Snap-
Pitch toward Canopy



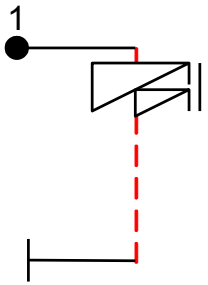
Negative Snap-
Pitch toward Gear

- In the event that the start of autorotation is delayed somewhat after the required pitch movement has been shown, it is possible that the aircraft will draw a visible line between the pitch and the start of autorotation. If this occurs, the maneuver should be zeroed (0).
- No penalty is to be applied for the offset or the realignment of the aircraft immediately after autorotation is completed.

Rotational Elements .5

Family 9

Spins



- Aircraft ***must*** stall wings level.
  - Zero for no stall (aileroning or snapping)
  - ½ point per 5° if wings not level on entry.
- Track and altitude maintained before stall.
  - ½ point per 5° of track or altitude change.
- The entry line to the spin is to be judged and downgraded as required in the same manner as any other wind corrected horizontal line.

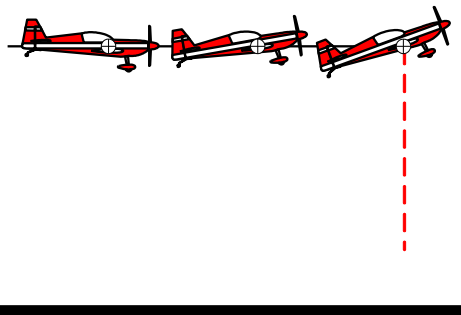


Fig. 58

The horizontal flight path should be maintained until the spin starts.

- The only exception to judging the entry line is if the spin entry line is also the entry to the sequence (First Maneuver). In this instance, the entry line is not judged and judging begins at the stall.

Rotational Elements .6

Family 9

Spins

- Nose & wing should simultaneously drop in spin direction: -½ point per 5° for error.
- Aircraft must auto-rotate during spin (no spiral dive. Spiral = 0).
- Aircraft must establish 90° wind corrected down-line after spin. -½ point per 5° for error from vertical. Omission of this line is to be downgraded one (1) point.

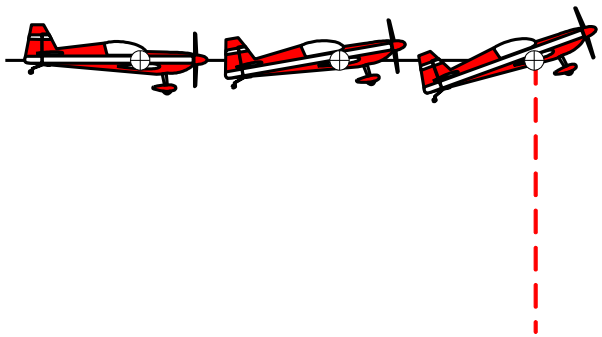


Fig. 58

The horizontal flight path should be maintained until the spin starts.

Agenda .E

Judging Principles

Mental Attitude

- Bias
- Self Confidence
- Independence
- Rules Adherence
- Technical Knowledge

Bias

Bias

- Can be either conscious or unconscious.
- Conscious bias - deliberately awarding an improper score = cheating.
- Unconscious bias – Unintentionally awarding points based on recognition, also known as the “halo-factor.” Other factors contributing to unconscious bias:
  - Style differences.
  - Aircraft type
  - Equipment preferences

Self Confidence

Self Confidence

- Based on the judge's knowledge of the rules instead of arrogance/ego.
- Confident judges know, understand, apply the criteria.
- Confident judges are comfortable giving a wide range of scores - Regardless of the pilot (World Champion or local pilot).

Sense of Independence

- **Sense of Independence**

  - Judging is an independent practice.
  - Do not influence or allowed to be influenced by others on the flight-line – other judges, scribes, callers, etc.
  - Communication with scribes should be conducted such that others cannot overhear.

Adherence to the Rules

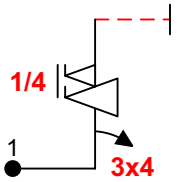
Adherence to the Rules

- Good judges understand that a fair contest results from all pilots being judged by a constant set of rules.
- Anyone unwilling to judge all pilots by the existing rules should disqualify him / herself.

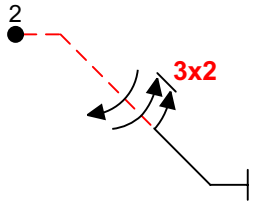
Technical Knowledge

- **Technical knowledge**
  - Applying a consistent, organized method of downgrading.
  - All maneuvers begin at a score of 10 and are downgraded per the criteria as the maneuver progresses.
  - Issue scores based on specific faults within the maneuver rather than overall impression of the maneuver.
  - Strive for a high degree of consistency and accuracy. Should maintain that standard throughout the contest.

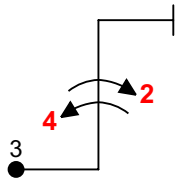
Judging Complex Figures



- 1st pt (-10°) + 2nd pt (+5°) = -1.5
- Snap ovr rot (15°) = -1.5
- Grade = 10 - 3.0 = 7.0



- 45 before (-10°)= -1.0
- Varied roll rate twice = -2.0
- Grade = 10 – 3.0 = 7.0

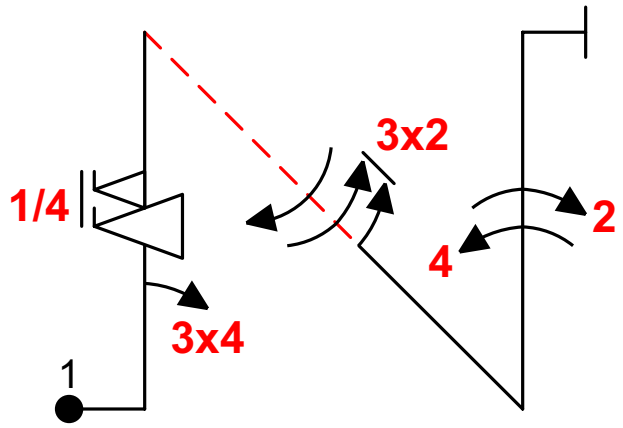


- 4x4, 2 pts (+5° @)= -1.0
- 2x2 ovr last point 10° = -1.0
- Exit off hdg (10°) = -1.0
- Grade = 10 - 3.0 = 7.0

Low scores do not necessarily indicate poor flying!

This is a demanding sport flown against very high standards.

Judging Complex Figures .2



If combination figure flown exactly the same as individual figures, grade = ????

1.0! Yet common to see not less than a 6.5 or 7.0, or even an 8.0, because judges have a subconscious bias against giving very low scores to highly experienced pilots!

Low scores do not necessarily indicate poor flying!

This is a demanding sport flown against very high standards.

Judging Unknowns

- Must prepare – review / know the sequence.
- Have a scribe – the seq. is probably unusual to you & you shouldn't look away to write scores.
- If judging Advanced or Unlimited, request an Aresti Caller from the CD – again, avoid looking away from aircraft.
- If judging above "your" class, guard against the halo bias.
- Don't judge higher than your current judging capabilities.
- KNOW the criteria for the Aresti Families.