

2009



INTRODUCTION TO AEROBATIC JUDGING

Student Handout

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**Welcome to the
International Aerobic Club's**

**Introduction to
Aerobic Judging**



Meet your Instructor:



Getting to Know You

- Name?
- Where are you from?
- Regional or National Judge?
- Active Competitor?
- Reason for taking this Course?



Course Materials

IN YOUR PACKET:

- Registration Form
- Student Handout
- Regional Judge Exam (available online at <http://members.iac.org/judges/exams.html>)
- Judging Log
- Judges School Analysis form

ALSO SHOULD OBTAIN:

- 2009 IAC Official Contest Rules available for FREE download at:
<http://members.iac.org/contests/rulebook.html>
- Aresti System Aerobic Catalogs (optional) available for purchase from the Aresti family's company (see www.arestisystem.com/english/catalogue/)



Course Outline

Today:

- Review of Requirements for becoming an IAC Judge
- Overview of the Competition Arena
- Introduction to the Aresti System Aerobatic Catalogue
- Learning the Aresti Language
- Constructing Aerobatic Figures
- Review of Catalogue Families

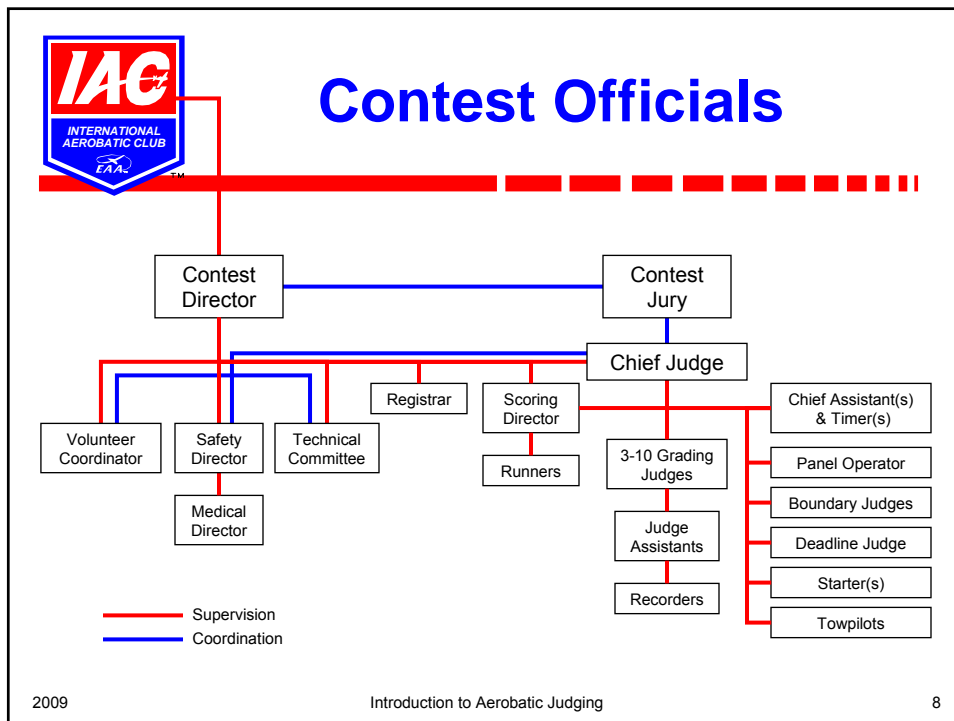
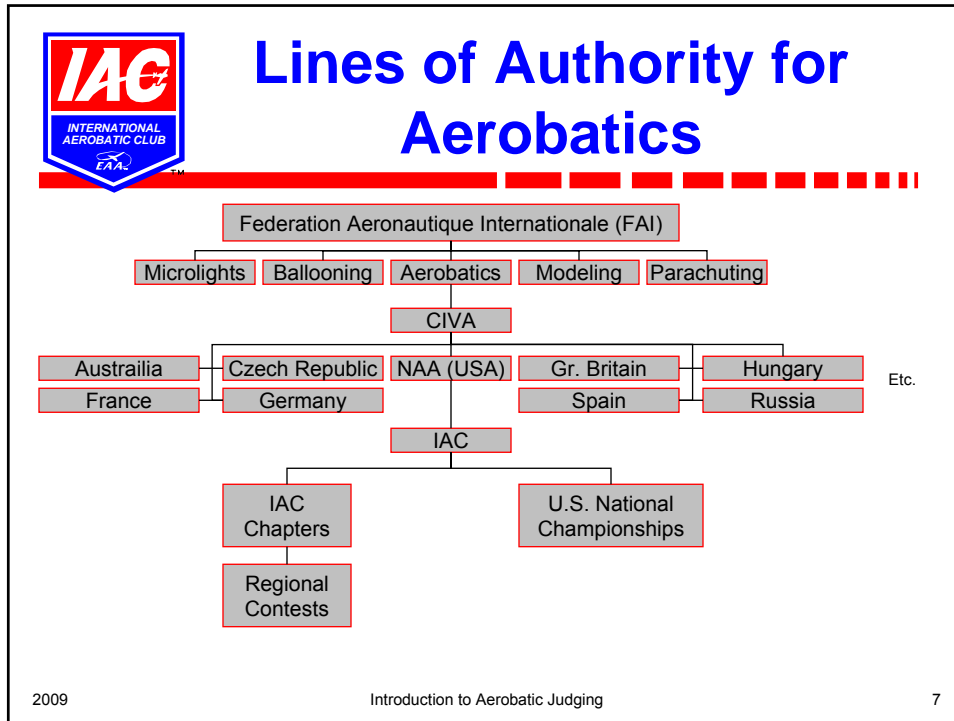
Tomorrow:

- Contest Flight Programs
- Checking a Free Program Sequence
- Judging Criteria



How To Become A Regional Judge (2.6.1)

1. Within 18 month period prior to application:
 - a. Attend this school
 - b. Complete the Regional Judge Exam (*received* a passing grade of 80% or higher)
 - c. Serve as an Assistant Judge for:
 - » 40 competitor flights minimum
 - » at least 10 in Advanced or Unlimited
2. AFTER completing the above, pass the Practical Exam
3. Send completed Regional Judge Application form to the Judges Certification Chair (contact info shown on application form)






Judges Line (2.5 - 2.9)

- Chief Judge supervises:
 - Chief Judge Assistants
 - Min of 3 to Max of 10 Grading Judges (usually 5-7) each with:
 - Judge Assistant
 - Recorder
 - Boundary & Deadline Judges
 - “Hot Box” Panels, if required (4.13.4 and 4.13.5)
 - Scoresheet Runner



Power Aerobatic Competition Categories

- **Primary – 2 flights (CD option for scheduling a 3rd flight)**
 - Known Program for all flights
- **Sportsman – 2 flights (CD option for scheduling a 3rd flight)**
 - Known Program, Repeat Known or optional Free Program
 - If 3rd flight program flown, must repeat program flown on 2nd flight
- **Intermediate – 3 flights**
 - Known, Free, and Unknown Programs
- **Advanced – 3 flights**
 - Known, Free, and Unknown Programs
- **Unlimited – 3 or 4 flights**
 - Known, Free, Unknown, and optional 4-Minute Freestyle Programs



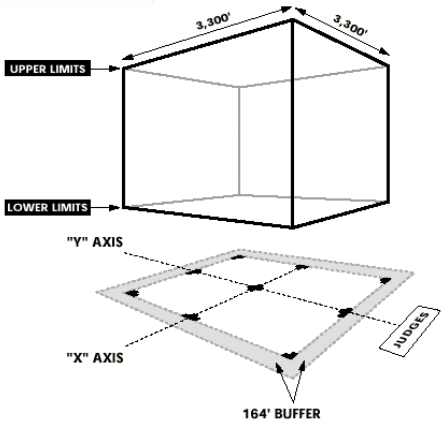
Power Aerobatic Box

Upper Limits →


- 3280'AGL - Unlimited
- 3500'AGL - All Others

Lower Limits →

- 1500'AGL Sportsman & Primary
- 1200'AGL Intermediate
- 800'AGL Advanced
- 328'AGL Unlimited



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Glider Aerobatic Competition Categories

- **Sportsman – 2 flights (CD option for scheduling a 3rd flight):**
 - Known Program, Repeat Known or optional Free Program
 - If 3rd flight program flown, must repeat program flown on 2nd flight
- **Intermediate – 3 flights:**
 - Known, Free, and Unknown Programs
- **Unlimited – 3 flights:**
 - Known, Free, Unknown Programs

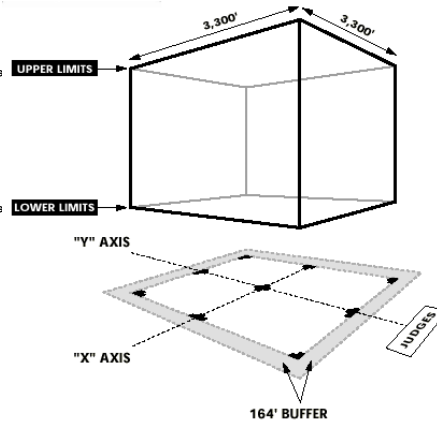
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Glider Aerobatic Box


Upper Limits
4000' AGL All Categories

Lower Limits
1500' AGL Sportsman
1200' AGL Intermediate
600' AGL Unlimited



Contest Judges' Forms (Appendix 7)

- Chief Judge's Penalty sheet
- Form A: Scoresheet
- Forms B and C: Sequence ("Flimsy")



Aresti Aerobatic Catalogue

Part I: Description of the Catalogue


- Introduces the Families
 - » Basic Figures (Families 1 through 8)
 - » Complimentary Figures (Family 9)
- Provides definitions of:
 - » Conventions Used in Drawing Basic and Complimentary Figures
 - » Extent of Rotations of Complimentary Figures (Family 9)
 - » Catalogue Numbering System

Part II: Method of Evaluation - Provides a rigorous method of evaluating the elements of figures to determine proper difficulty coefficients (K-factors)

Part III: LIST OF FIGURES

- 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 & Eights
- Family 8 - Combinations of Lines, Angles & Loops
- Family 9 - Rolls and Spins


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Aresti Symbols: Key Concepts


- Basic Figures come from Families 1-8
- Complimentary Figures (rotational elements) come from Family 9
- Simple Numbering System to Locate Figures in Catalogue
 - Families 1-8 figures have 3 numbers separated by periods:
F.R.C = Family, Row, Column Ex: Let's find [figure 1.2.3](#)
 - Family 9 figures have 4 numbers separated by periods:
F.SF.R.C = Family, Sub-Family, Row, Column Ex: Let's find [figure 9.1.3.4](#)
- Character of Figures and Figure Elements
- Unspecified Rotations in Families 1-8 vs. Specified Rotations from Family 9
 - Catalogue shows locations in Family 1-8 figures where Family 9 rotational elements may, and sometimes must be added (i.e., Unspecified)
- Preservation of Character in Basic Figures
 - Added rotational elements must preserve character
 - Some basic figures require rotations to preserve character
 - Effect of 90°, 180°, 270°, and 360° Rotations on Vertical Lines (no change of character)

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 **Aresti Symbols have Character (Glossary)**




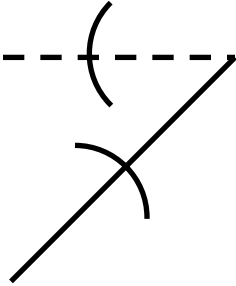
A solid line represents positive loading or angle of attack (character).



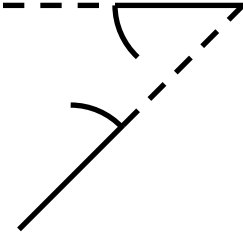
A dashed line represents negative loading or angle of attack (character).

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 **Unspecified Rotations (Rolls on Horizontal and 45° Lines)**




Optional 360° change of attitude

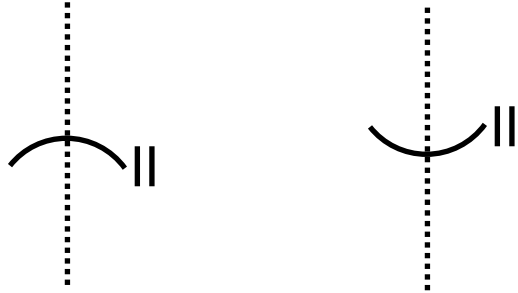


Mandatory 180° change of attitude

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 **Unspecified Rotations**
(Rolls on Vertical Lines)

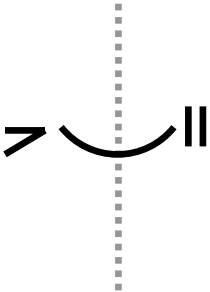
Vertical Optional Rotation Symbol



Rotation going Up Rotation going Down


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 **Unspecified Rotations**
(Roll or Spins on Vertical Down-Line)







The Optional Spin (or vertical Roll down) Symbol

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 **Specified Rotations: Rolls**

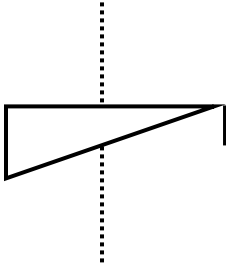
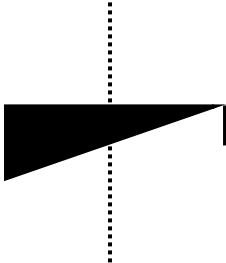
Aileron rolls **Snap rolls**

UP DOWN UP DOWN


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 **Specified Rotations: Spins**

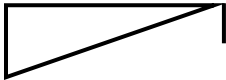
 


INSIDE or UPRIGHT OUTSIDE or INVERTED


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Aresti Symbols: Spins vs. Snap Rolls



UPRIGHT SPIN


INVERTED SPIN

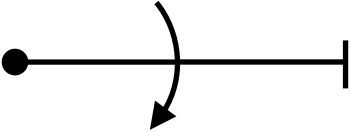

POSITIVE SNAP

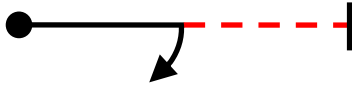

NEGATIVE SNAP

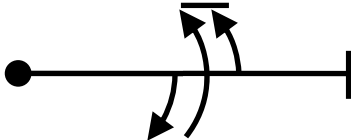
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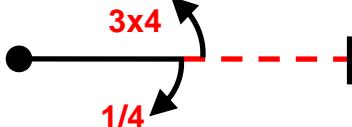


Aerobic Figure Construction


Optional full roll symbol on 1.1.1 requires family 9 figure(s) of a multiple of 360° total rotation


Mandatory half roll symbol on 1.1.3 requires family 9 figure(s) of a multiple of 180° total rotation





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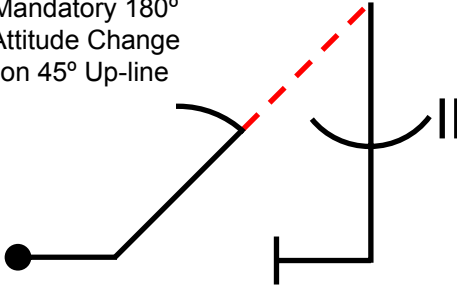


Figure Construction: Start with Basic Figure

Mandatory 180° Attitude Change on 45° Up-line



Catalog #: 1.14.1 K factor: 12

Optional 90° Attitude Change On Vertical Down-line

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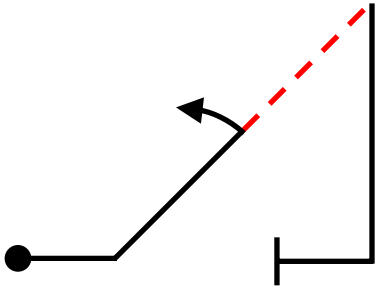


Figure Construction: Completed by Adding Rolls



Catalog #: 1.14.1 K factor: 12
+ 9.1.2.2 + 6
 18

This is a complete figure!

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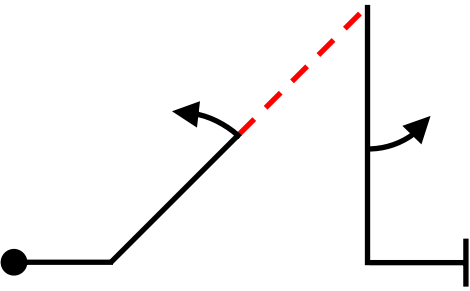


Figure Construction: Completed by Adding Rolls



Catalog #:	K factor:
1.14.1	12
+ 9.1.2.2	+ 6
+ 9.1.5.2	<u>+ 4</u>
	22

This is also a complete figure but different from the previous slide (note the change of direction)

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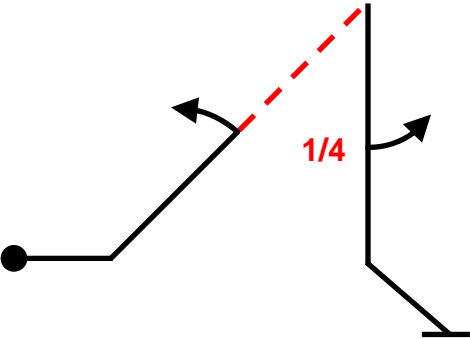


Figure Construction: Completed by Adding Rolls



Catalog #:	K factor:
1.14.1	12
+ 9.1.2.2	+ 6
+ 9.1.5.1	<u>+ 2</u>
	20

Again a complete figure but different from the previous slides (note the change of axis)

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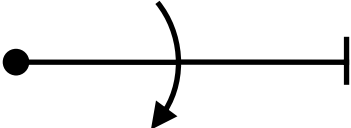
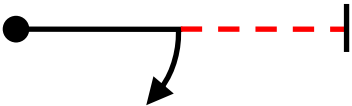


Figure Construction



<u>Catalog #:</u>	<u>K factor:</u>
1.1.1	2
+ 9.1.3.4	+ 8
	<hr style="width: 100%; border: 0.5px solid black;"/>
	10



<u>Catalog #:</u>	<u>K factor:</u>
1.1.3	2
+ 9.1.3.2	+ 4
	<hr style="width: 100%; border: 0.5px solid black;"/>
	6

Note: Some kind of roll or roll combination is required on 1.1.1 by rule (no plain horizontal lines allowed in competition)

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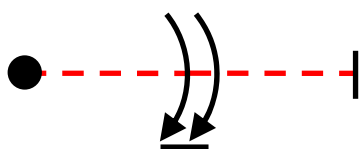
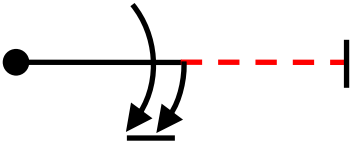


Figure Construction



<u>Catalog #:</u>	<u>K factor:</u>
1.1.2	3
+ 9.1.3.8	+ 12
	<hr style="width: 100%; border: 0.5px solid black;"/>
	15



<u>Catalog #:</u>	<u>K factor:</u>
1.1.3	2
+ 9.1.3.6	+ 10
	<hr style="width: 100%; border: 0.5px solid black;"/>
	12

Note: Some kind of roll or roll combination is required on 1.1.2 by rule (no plain horizontal lines allowed in competition)

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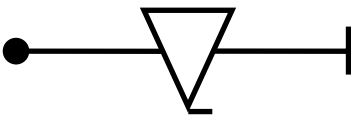
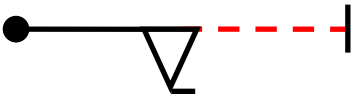


Figure Construction




<u>Catalog #:</u>	<u>K factor:</u>
1.1.1	2
+ 9.9.3.4	<u>+ 11</u>
	13



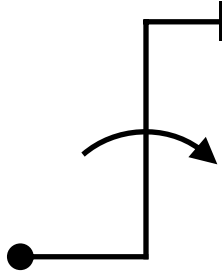
<u>Catalog #:</u>	<u>K factor:</u>
1.1.3	2
+ 9.9.3.2	<u>+ 11</u>
	13

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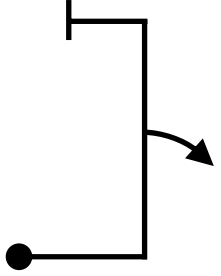


Effects of Adding Different Family 9 Rolls

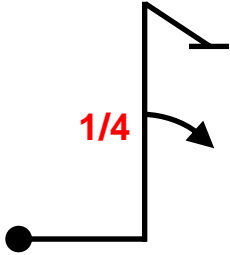
EXAMPLES:



1.6.1
+ 9.1.1.4
(Full Roll)



1.6.1
+ 9.1.1.2
(1/2 Roll)



1.6.1
+ 9.1.1.1
(1/4 Roll)

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Quiz: Determine Catalog Numbers and K-factors


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Additional Glider Figures: Family 9.13

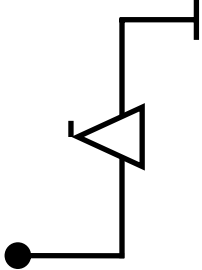
GLIDER FAMILY 9.13
SUPER SLOW ROLLS

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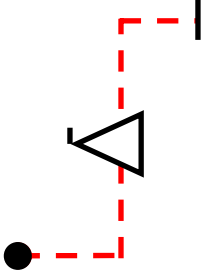


Family 9.9-9.10: Snap Rolls Which Snap?

- The loading (AoA) on the airplane determines the catalog number of the snap, with one exception that will be covered shortly.




1.6.1 (10K)
+ 9.9.1.4 (15K)

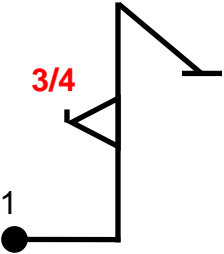


1.6.2 (11K)
+ 9.9.6.4 (17K)

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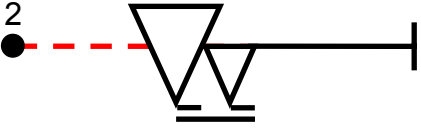


Determine Catalog Numbers and K-factors

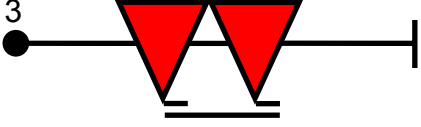


1

3/4



2



3

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Family 9.9-9.10: Snap Rolls Exceptions

- The loading (positive or negative) of the line determines the catalog number of the snap EXCEPT when the angle of attack (AoA) is zero
- There are four situations where the AoA = 0 exception occurs:
 1. Snaps on the down-line of a Hammerhead
 2. Snaps on the down-line of a Tailslide
 3. Snaps after a vertical roll
 4. Snaps after a spin

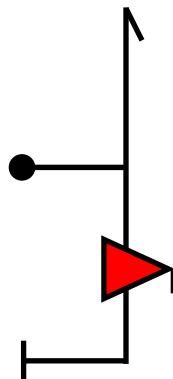
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Family 9.9-9.10: Snap Rolls Exception (1 of 4)



5.1.1 (17K)
+ 9.10.5.4 (13K)


NOT 9.10.10.4 (15K)

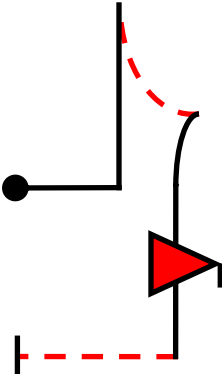
**Since AoA is zero on the
down-line of a hammerhead**

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 **Family 9.9-9.10: Snap Rolls
Exception (2 of 4)**




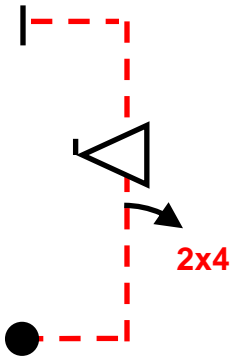
6.2.3 (16K)
+ 9.10.5.4 (13K)

NOT 9.10.10.4 (15K)

Since AoA is zero on the
down-line of a tailslide

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 **Family 9.9-9.10: Snap Rolls
Exception (3 of 4)**




1.6.2 (11K)
+ 9.4.1.2 (9K)
+ 9.9.1.4 (15K)

NOT 9.9.6.4 (17K)

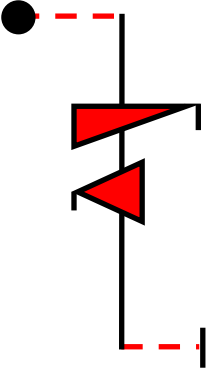
Since AoA is zero
after any vertical roll

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Family 9.9-9.10: Snap Rolls

Exception (4 of 4)




1.6.4 (10K)
 + 9.12.1.4 (7K)
 + **9.10.5.4 (13K)**

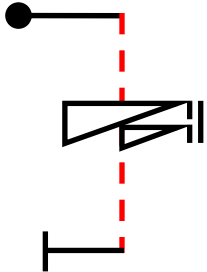
NOT 9.10.10.4 (15K)

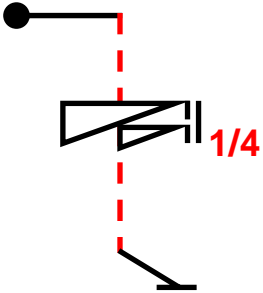
Since AoA is zero
after a spin

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Family 9.11-9.12: Spins






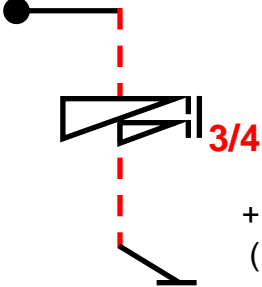
1.6.3 (10K)
 + 9.11.1.6 (3K)
 (1 ½ Turn Spin)

1.6.3 (10K)
 + 9.11.1.5 (4K)
 (1 ¼ Turn Spin)

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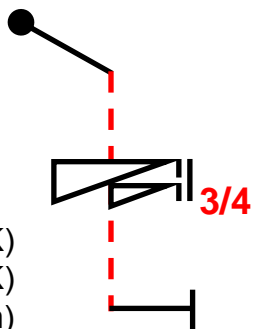


Family 9.11-9.12: Spins




X-axis entry
Y-axis exit

1.6.3 (10K)
+ 9.11.1.7 (3K)
(1 3/4 Turn Spin)




Y-axis entry
X-axis exit

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Multiple Rolls

Rotations must be flown as Drawn!



1st roll direction arbitrary,
2nd roll must be same direction

OR



1st roll direction arbitrary,
2nd roll must be opposite direction

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Multiple Rolls

Aileron or Snap Rolls may be added after Spins

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Rules for Multiple Rolls

✓ Legal and ✗ Illegal Constructions

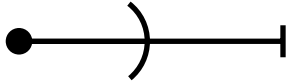
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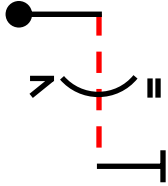
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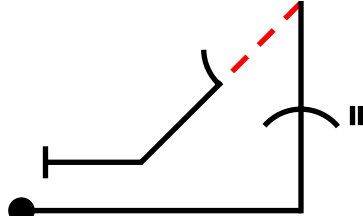


Family 1: Lines and Angles


1.1.1 

1.1.3 

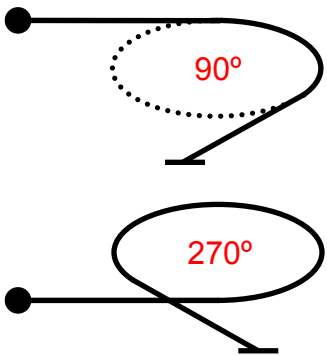
1.6.3 

1.18.1 

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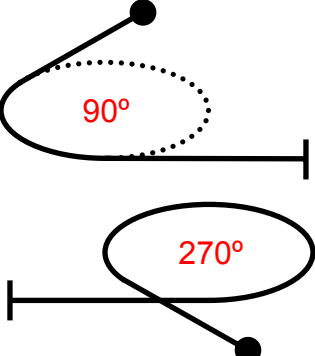
Family 2: Turns & Rolling Turns



90°

270°

X to Y Axis Turns
Direction is pilot's option




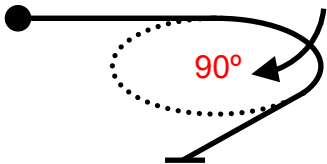
90°

270°

Y to X Axis Turns
Must exit in correct direction

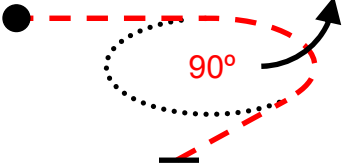
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 **Family 2: Turns & Rolling Turns**



2.3.1


“90° Roller, One Roll INside, End [on Y-Axis]”

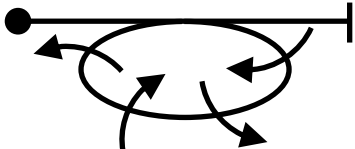


2.3.4

“Inverted 90° Roller, One Roll OUTside, End Inverted [on Y-Axis]”

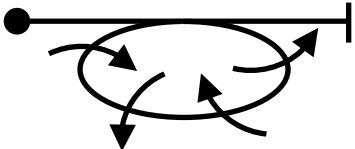
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 **Family 2: Turns & Rolling Turns**



2.15.1


“360° Opposite Roller, First Roll IN, Roll OUT, Roll IN, Roll OUT, End”

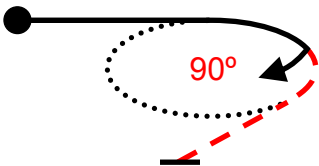


2.15.3

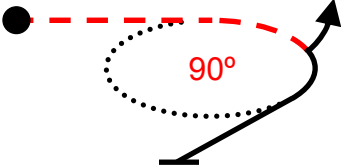
“360° Opposite Roller, First Roll OUT, Roll IN, Roll Out, Roll IN, End”

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 **Family 2: Turns & Rolling Turns**




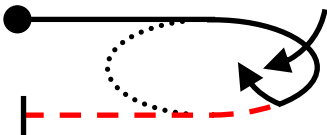
2.16.1
"90° Roller to Inverted, ½ Roll IN, End Inverted [on Y-axis]"



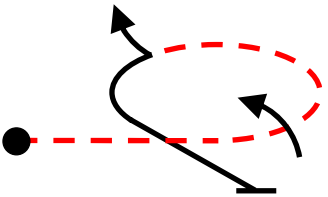
2.16.4
"90° Roller to Upright, ½ Roll OUT, End Upright [on Y-axis]"

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 **Family 2: Turns & Rolling Turns**




2.17.1
"180° Roller to Inverted, 1½ Rolls IN, End Inverted"





2.20.2
"270° Roller to Upright, One Roll IN, ½ Roll OUT, [End Upright on Y-Axis]"



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Family 3


Combinations of Lines



1  9 



11  11 



13  12 



10  10 



3  11 



12  11 

12  12 


4  22 

23  22 

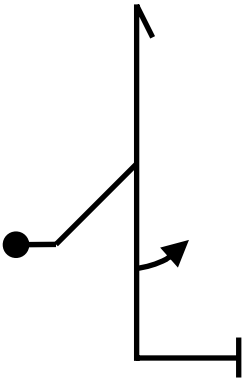
22  23 

23  23 

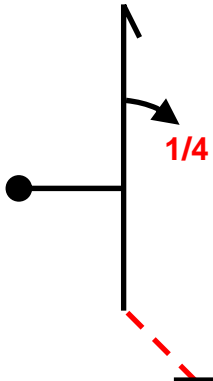
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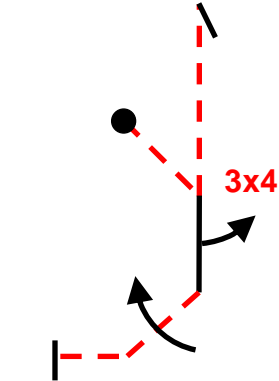
Family 5: Hammerheads



"45 Up, Hammer,
1/2 Roll Down,
End"



"Hammer, 1/4 Roll Up,
Push Out on Y-Axis, End"



"Hammer, 3 of 4 Down,
Push 45 down to the left,
Full Roll, Push Out, End"

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Family 5: Hammerheads Drawing Convention

Which drawing is correct?

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Family 6: Tailslides


1

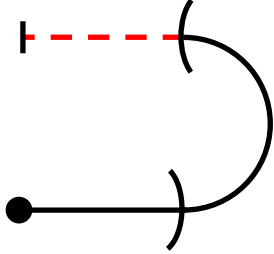
6.1.x "Wheels-Down" or "Canopy-Up"

2

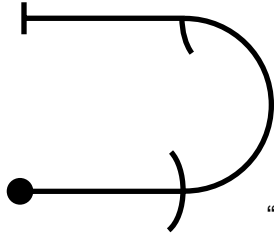
6.2.x "Wheels-Up" or "Canopy Down"

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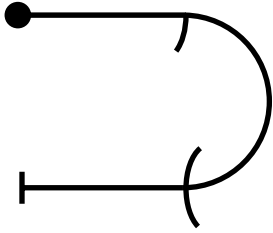
 **Family 7:
Loops and Eights**



7.1.1
“ ___ Roll, Half Loop Up,
___ Roll, End Inverted”




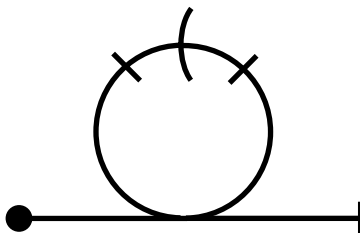
7.2.1
“ ___ Roll, Half Loop Up,
___ Roll, End Upright”



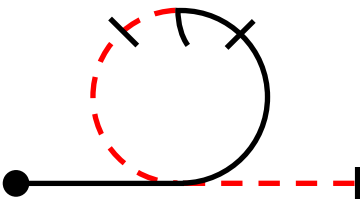
7.3.3
“ ___ Roll, Half Loop Down,
___ Roll, End Upright”

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 **Family 7:
Loops and Eights**




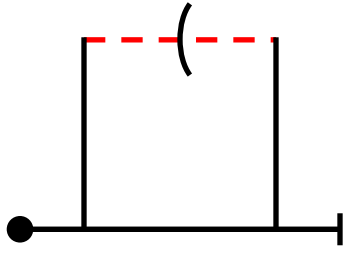
7.5.x
Full Loops
(Optional Full Rotation)



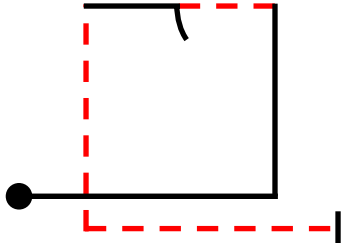
7.6.x
Full Loops
(Mandatory 180° Roll Attitude Change)

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 **Family 7:
Loops and Eights**




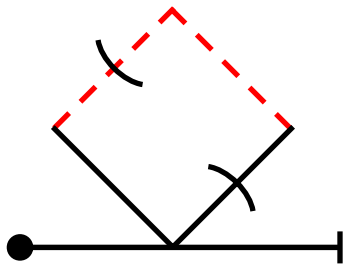
7.7.x
Square loops
(Optional Full Rotation)



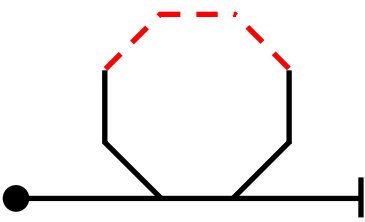
7.8.x
Square loops
(Mandatory 180° Roll Attitude Change)

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 **Family 7:
Loops and Eights**



7.9.x
Diamond Loops



7.10.x
Eight Sided Loops

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Family 7: Loops and Eights

7.11.x
Vertical S's
(No Rolls Allowed)

7.12.x
Vertical S's
(Mandatory Half Roll)

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Detailed description: This slide illustrates two variations of the 'Vertical S's' maneuver. The IAC logo is in the top left. The title 'Family 7: Loops and Eights' is in blue. A red dashed line indicates the path of the maneuver. The first diagram, labeled 7.11.x, shows a solid black line starting from a black dot on the left, moving horizontally to the right, then curving down and left to form the bottom loop, and finally curving up and right to form the top loop, ending with a horizontal line to the right. The second diagram, labeled 7.12.x, shows a similar path but with a dashed red line for the top loop, indicating a mandatory half roll.

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Family 7: Loops and Eights


7.16.1
Vertical-8

7.20.1
Partial 8

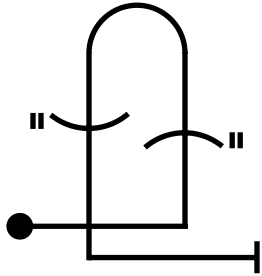
7.26.1
Horizontal-8

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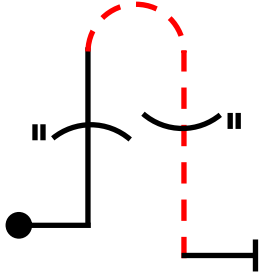
Detailed description: This slide illustrates three variations of 'Loops and Eights'. The IAC logo is in the top left. The title 'Family 7: Loops and Eights' is in blue. The first diagram, labeled 7.16.1, shows two vertically stacked circles connected by a vertical line, with a horizontal line extending from the bottom circle to the right. The second diagram, labeled 7.20.1, shows a partial figure-eight shape with a dashed red line for the top loop and a horizontal line extending from the bottom circle to the right. The third diagram, labeled 7.26.1, shows a horizontal figure-eight shape with a dashed red line for the top loop and a horizontal line extending from the bottom circle to the right.



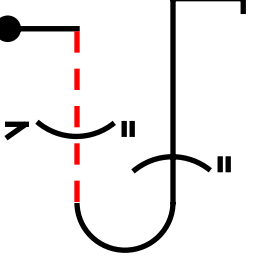
Family 8: Combinations of Lines, Angles and Loops



8.1.1
*"Humpty, Pull Vertical,
 __ Roll, Pull Down, __ Roll,
 Pull Out to your Right, End"*




8.3.1
*"Humpty, Pull Vertical,
 __ Roll, Push Down, __ Roll,
 Pull Out to your Right, End"*

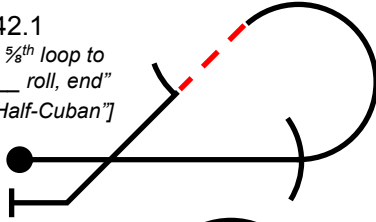


8.3.3
*"Down-Humpty, Push Down,
 __ Roll, Pull Vertical, __ Roll,
 Push Out to your Right, End"*

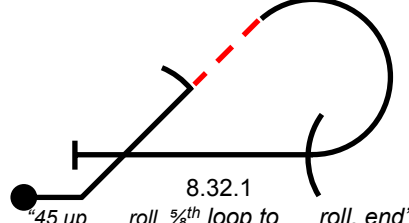
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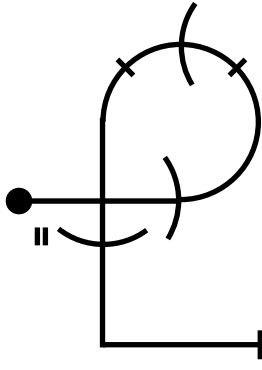
Family 8: Combinations of Lines, Angles and Loops



8.42.1
*"__ roll to 5/8th loop to
 45 down, __ roll, end"
 [basis of "Half-Cuban"]*




8.32.1
*"45 up, __ roll, 5/8th loop to __ roll, end"
 [basis for "Reverse Half-Cuban"]*



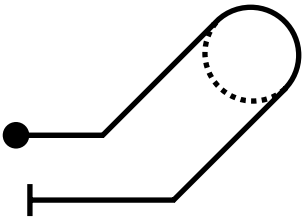
8.43.1
*"P-Loop, __ roll, 3/4 Loop
 w/ __ roll on top, __ roll down, end"*

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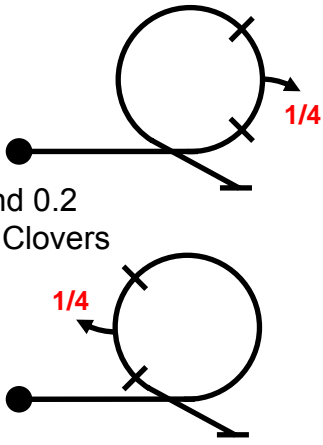


Family 0:

Additional Figures (pg 8-9)




0.0
Wingover



0.1 and 0.2
Quarter Clovers

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POWER COMPETITION FLIGHT PROGRAMS (5.1)

Category	Known ⁽¹⁾	Free	Unknown ⁽⁴⁾	4 Minute Freestyle ⁽⁵⁾
Primary	✓			
Sportsman	✓	✓ (2), (3)		
Intermediate	✓	✓	✓	
Advanced	✓	✓	✓	
Unlimited	✓	✓	✓	✓

Notes: 1. The Known compulsory or "qualifier" flight and must be flown first. Competitors must complete at least 75% of the figures in the sequence to qualify for further contest flying (5.2.1 and 5.2.2)


2. Instead of a Freestyle, Sportsman may repeat the Known sequence for the second flight (5.1.3)

3. A 3rd Sportsman flight, if scheduled, must repeat sequence flown on 2nd flight (5.1.4.c)

4. Unknowns must be made available to contestants by the CD no later than **12** hours prior (5.5.4)

5. The 4-Minute Freestyle is a separate trophy event for Unlimited-Power **or Glider** category competitors **ONLY** (5.1.1 and 5.6.1)

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GLIDER COMPETITION FLIGHT PROGRAMS (5.1)

Category	Known ⁽¹⁾	Free	Unknown ⁽³⁾
Sportsman	✓	✓ ⁽²⁾	
Intermediate	✓	✓	✓
Unlimited ⁽⁴⁾	✓	✓	✓


Notes: 1. The Known compulsory or “qualifier” flight and must be flown first. Competitors must complete at least 75% of the figures in the sequence to qualify for further contest flying (5.2.1 and 5.2.2)

2. A 3rd Glider Sportsman flight, if scheduled, must repeat the program (Known or Free) flown on 2nd flight (5.1.4.c)

3. Unknowns must be made available to contestants by the CD no later than **12** hours prior to when that flight is scheduled (5.5.4)

4. Unlimited Gliders can now participate in the Unlimited 4-min Free Program


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KNOWN COMPULSORY FLIGHT PROGRAMS

- SPORTSMAN and INTERMEDIATE Category Known Proposals:
 - Generated by the membership and sent to IAC Rules Committee Chair, who refers them to a *Known Sequence Review Committee* [new for 2009 Known proposals]
 - Proposed Known Programs are then published for membership comment
 - The IAC Policy and Procedure Number 221 3.C.(2) now states:
 - » SPORTSMAN: “...shall be *flyable* by aircraft with performance similar to the 115 hp Citabria”
 - » INTERMEDIATE: “...shall be *flyable* by aircraft with performance similar to the 150 hp Decathlon”
- ADVANCED and UNLIMITED Categories:
 - Each country submits proposal to CIVA
 - CIVA selected “Q Programs” are reviewed by IAC Rules Committee, and unless changes are warranted, they will become “Known” Programs for use in IAC competition
 - IAC Policy and Procedure Number 221 paragraph 3.C.(4) now states:
 - » ADVANCED: “...shall be *flyable* by aircraft with performance similar to the Pitts S-2A”
- IAC BoD approves selected Known Programs at the fall BoD Meeting

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Free Programs (Tables 6.2.1 & 6.2.2)

Created by each contestant and approved by a current Judge

Category	Power			Glider		
	Max # of Figures	Max K-factor ¹	Presentation K-factor	Max # of Figures	Max K-factor ²	Presentation K-factor
Sportsman	No limit	Same as current Known	6	No limit	Same as current Known	15
Intermediate	15	190	8	No limit	140	15
Advanced	12	300	12			
Unlimited	9	420	26	10	230	35

Note 1) Power Free Programs - Actual K allowed use of a "Floating Point" to meet the Max K limit by reducing the highest K figure by 1K (see 6.2)
 2) Glider Free Programs – Actual K can be up to 3K higher than these limits but one pt "Floating Point" must be taken from highest K figures, starting with the highest K, and continuing with next lowest K, until listed Max K is reached (see 6.2.1)

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Free Program Rules (Chapter 6)

- Advanced and Unlimited requirements aligned with CIVA
- Required Versatility (6.3)
- Start and Finish Attitudes (6.4)
- Allowable Figures and Documentation (6.5 and 6.6)
- Definitive Criterion (6.7)
 - Before Free Program is in progress (1st competitor to taxi) - Form A is definitive
 - After Free Program is in progress - Form in use (B or C) is definitive
- Repetition of Figures (6.8)
- Forms A, B, and C must be certified compliant by an IAC Judge (6.14)
- Penalties prescribed for non-compliance (6.15 and 6.16)
- Judge's checklist for checking compliance (6.16)
 - Must be completed by a current IAC Judge before signing Forms A, B, and C
 - No requirement for new signature each year unless rule changes affect legality
 - Also used by Contest Jury to adjudicate non-compliant Free Programs

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Unknown Programs

- Allowable Unknown Figures
 - Appendix 3 (Power)
 - Appendix 4 (Glider)
- Supplied by membership to Rules Committee Chair
 - Can be submitted ANYTIME during the contest year
 - Design Limitations Provided (5.5)
- Provided to each Contest Director by IAC HQ
 - Must be provided to competitors no less than 12 hours prior to when the Unknown flight is scheduled to be flown (5.5.4)
 - May be modified by the Contest Jury if deemed necessary for safety (1.4.2.c)
 - A safety pilot competing in the same category must fly the Unknown Program before acting as a safety pilot for another competitor flying that Unknown Program (2.2)



Unknown Program Design Limits (5.5)

- Unlimited Power (5.5.6):
 - 10 to 14 figures not exceeding 400K
 - Maximum of 6 snaps (no more than 4 snaps from same family and at least one in a vertical climbing figure)
- Unlimited Glider (5.5.6):
 - 7 to 10 figures not exceeding 190K
 - No single figure may exceed 35K
- Advanced (5.5.7):
 - 10 to 14 figures not exceeding 275K
 - Minimum of 2 and Maximum of 4 snaps from Family 9.9.x.x
- Intermediate (5.5.8):
 - Power: 6-12 figures not exceeding 175K
 - Glider: 6-9 figures not exceeding 110K



Judging Aerobatic Figures

- Grade of “10” is given to the PERFECT figure
- For less than perfect figures, grade must be reduced consistently and accurately using the prescribed criteria (8.2.2)
 - Each figure is assumed to start as a “10” and downgraded in 0.5 point increments for each deviation observed *as they occur*
 - Waiting for the entire figure to be completed and then scoring from “memory replay” is neither accurate nor consistent
- Do not confuse generosity with fairness
 - The same criteria are applied to a novice pilot and the experienced pilot

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Judging Aerobatic Figures: General Grading Criteria

- Aircraft Heading alignment with X or Y axis
- Correct figure (Form B or C)
- Distinct horizontal lines between figures (Gliders may be ascending or descending lines)
- Rolls must be centered on line (with certain exceptions)
- Cumulative grading criteria of each component
- Any combination of flightpath, heading, and/or roll attitude deviation of 50° or more is a “cumulative zero”

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Judging Aerobatic Figures: General Grading Criteria (cont)

- Length of lines is NOT a grading criterion
- Size of loops and part loops is NOT a grading criterion (except in comparing part loops within a figure)
- Rate of roll is NOT a grading criterion as long as it's constant
- Correcting errors in exit flight path, bank angle, or heading between figures is NOT a downgrade for the subsequent figure
 - Deductions already applied to previous figure
 - However, once corrected, any subsequent change in flight path, bank angle, or heading, requires a 1 point per 5° downgrade to the next figure

2009

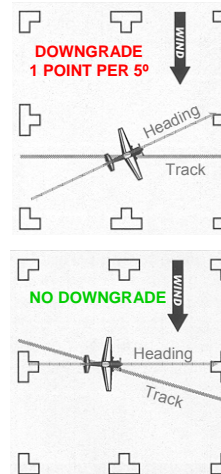
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Judging Aerobatic Figures: Heading

- Aircraft's heading (not track) must remain in a plane parallel with the X or Y axis, except during Family 2 turns
- Deduct 1 point for every 5° of visible "crabbing"
- Heading corrections *between* figures are not a downgrade to the subsequent figure (deduction already applied to previous figure).
 - However, once corrected, any further deviations in aircraft heading requires a 1 point per 5° downgrade to the next figure
 - Heading corrections of 90° or more between figures will also result in an "Interruption Penalty" (see 4.16.3)



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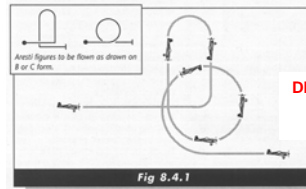
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Judging Aerobatic Figures: Beginning and End of Figure (7.2.1)

- All figures BEGIN as soon as the airplane departs horizontal, wings-level flight path
- All figures END as soon as the airplane returns to horizontal, wings-level flight path
- Figures must be separated by a distinct horizontal line
 - The absence of a distinct straight, horizontal flight path between figures requires a deduction of 1 point for each figure for “no line between”

EXCEPTION: **GRADING** of 7.7 “square” or 7.8 “octagon” loops ends when the last line is flown of equal length as the 1st line (discussed in detail later)




DEDUCT 1 POINT FROM EACH FIGURE



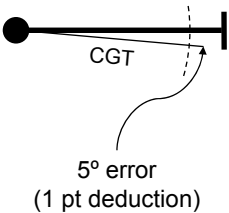
Signaling and Program Interruption Defined (4.16)

- Proper “signal” defined as “visible and distinct dipping of the wings” (4.16) and required for:
 - a) Beginning a flight program
 - b) Explicitly interrupting a flight program
 - c) Resuming a flight program after a competitor initiated explicit interruption
- *Explicit* Program Interruption (4.16.2) is defined by any interruption to the flight program initiated by the competitor
- *Implicit* Program Interruption (4.16.3) occurs when:
 - a) Correcting a heading deviation of 90° or more *between* figures.
 - b) Regaining height, in the case of altitude difficulties.
 - c) Adding a figure to a sequence to correct a heading or attitude
 - Example: Addition of a roll from inverted to upright to correct the attitude for the next and subsequent figures
- No signal required for “implicit” program interruption (4.16.3)
- Improper program resumption after a competitor initiated explicit interruption shall incur no more than one additional penalty per program interruption
- Penalties for program interruptions are assessed by the Chief Judge

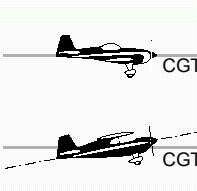


Judging Aerobatic Figures: Horizontal Lines

- All Horizontal Lines are Judged on Flight Path defined by the Trajectory of the Center of Gravity (CGT)
- NOT judged by aircraft's attitude
- Deduct 1 point per 5° of error between CGT and horizontal



5° error
(1 pt deduction)




High Speed:
Level Attitude
Level CG Trajectory

Low Speed:
Nose Up Attitude
Level CG Trajectory

No points deducted from either of these!

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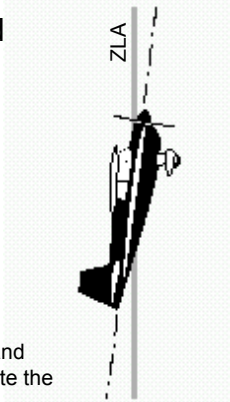


Judging Aerobatic Figures: Vertical Lines

Vertical Lines Judged on Attitude of the Zero-Lift Axis (ZLA)

NOT
The “Apparent”
Longitudinal
Axis

Note: Where the terms “CGT” and “ZLA” appear, they indicate the appropriate reference for judging an element of a figure



ZLA must be Vertical to Horizon

Wings must be parallel to horizon

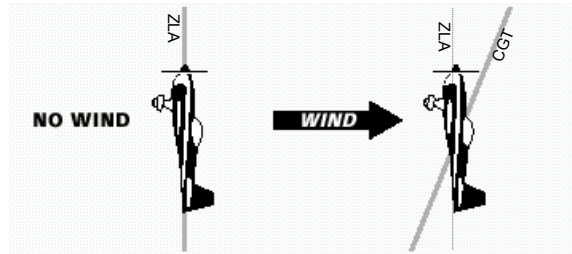
1 point deduction for each 5° error in the ZLA attitude

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Judging Aerobatic Figures: Vertical Lines

Vertical lines are NOT Wind Corrected
Zero lift Axis (ZLA) must be vertical, wings parallel to horizon

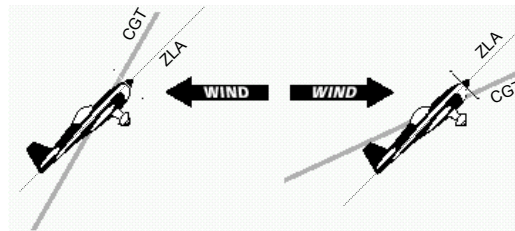


No deduction for either of these!




Judging Aerobatic Figures: 45 Degree Lines

45° Judged by Attitude of the Zero Lift Axis (ZLA)
Relative to Vertical plus or minus 45°

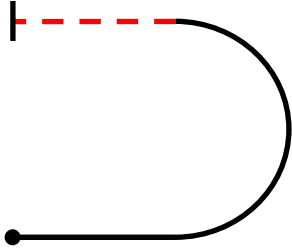


45° lines are NOT Wind Corrected
(i.e. NOT judged on Flight Path or CG Trajectory)




Judging Aerobatic Figures: Loops and Partial Loops

- Judged by Flight Path of the Aircraft's CG Trajectory (CGT)
- The radius of any looping segment must be constant



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Judging Aerobatic Figures: Errors in Line Lengths (8.4.1.f)

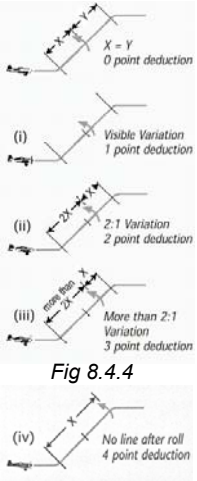


Fig 8.4.4

Fig 8.4.5

No line between figures:

- 1 point from each figure

Errors in Line Length:

- 1 point - visible variation
- 2 points - 2:1 variation
- 3 points - greater than 2:1 variation
- 4 points - no line before or no line after roll
- 2 points - no line before and no line after


Note: These deductions apply to;

- errors in length of different lines within a figure that are required to be equal (i.e. square loops) AND to
- errors in roll placement on a line

Exceptions for Gliders:

- Snap rolls need not be centered on interior lines

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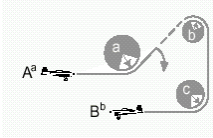
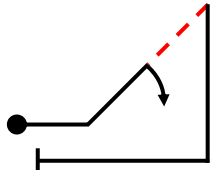


Judging Aerobatic Figures: Family 1 - Lines and Angles

GRADING CRITERIA:


- Constant radii, but need not be equal (CGT)
- Horizontal lines judged on flight path (CGT)
- 90° and 45° lines judged on attitude (ZLA)
- If present, rolls must be centered

- Exit altitude may be higher or lower than entry altitude.

Ex: 1.14.1
+ 9.1.2.2

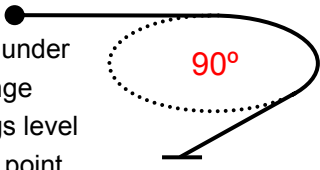
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Judging Aerobatic Figures: Family 2 – Turns


GRADING CRITERIA:

- Minimum bank angle of 60°: – 1 point per 5° under
- Bank angle established *before* heading change
- Final heading established *before* rolling wings level
- Rate of roll-in determines rate of roll-out: – 1 point per variation
- Constant rate of turn: ≤ 1 point per variation
- Constant altitude:
 - – 1 point per 5°, or
 - – 1 point per 100 ft variation
- NOT wind corrected; 360° turns will not finish over the same point if there is any wind - no downgrade



Ex: 2.2.3

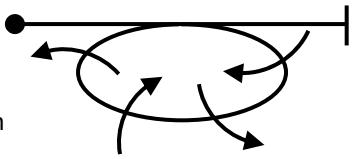
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Judging Aerobic Figures: Family 2 (cont) - Rolling Turns


GRADING CRITERIA:

- Constant altitude:
 - – 1 point per 5°, or
 - – 1 point per 100 ft variation
- Constant rate of turn: – ≤ 1 point per deviation
- Constant rate of roll: – ≤ 1 point per deviation
- No stoppage of roll: – 1 point for each stop
- In opposite rolls:
 - roll must be completed before reversal: – 1 point per 5° of under/over rotation at reversal
 - Minimal pause between opposite rolls, as in hesitation rolls
- Rolls in Rolling Turns are slow rolls: zero figure if snap roll performed
- Correct number and direction of rolls
- Even integration of rolls into turn (no turning without rolling or rolling without turning!)
- Finish on heading: – 1 point for each 5° of error at finish



Ex: 2.15.1

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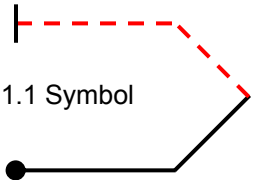


Judging Aerobic Figures: Family 3 - Combinations of Lines

GRADING CRITERIA:

- Identical radii of all part loops (CGT)
- Identical length lines within the figure
 - 1st non-horizontal line sets the length by which all subsequent lines are judged

Ex: 3.1.1 Symbol



$$A = B$$

$$a = b = c$$

3.1.1.

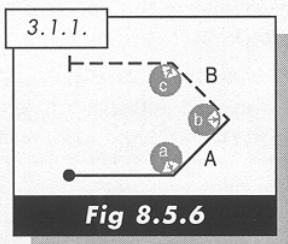



Fig 8.5.6

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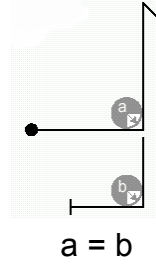


Judging Aerobatic Figures

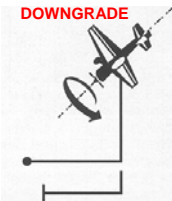
Family 5 – Hammerheads

GRADING CRITERIA:


- Identical radii of all loop segments (CGT)
- Attitude of Vertical and 45 deg lines (ZLA), wings level
 - Downgrade by 1 point per 5° of error
- Rolls centered on 45 deg and vertical lines
- Pivots within a “circle of acceptable error”, the radius of which is ½ wingspan
 - Downgrade by 1 point for each ½ wingspan the pivot is completed outside the “circle of acceptable error”
- Wings and the ZLA remain in the vertical geometric plane during the pivot
 - Downgrade by 1 point per 5° of error (torquing)
- Altitude gain/loss is not a grading criterion



DOWNGRADE

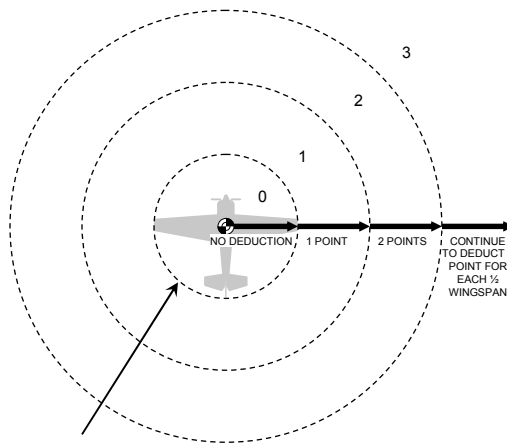


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Judging Aerobatic Figures


Family 5 - Hammerheads (cont)



CIRCLE OF ACCEPTABLE ERROR

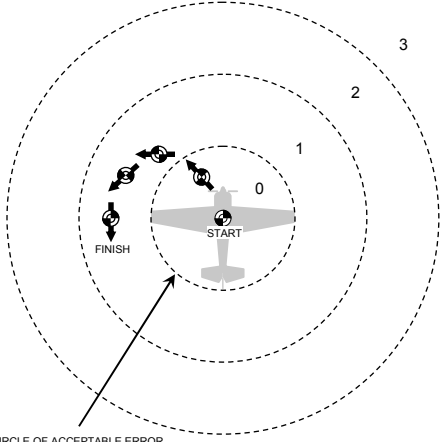
- This figure illustrates the concept adopted in 2004 that the pivot may occur anywhere in a “Circle of Acceptable Error” (radius of ½ wingspan) before downgrades for pivot location would be applied
- This new concept still allows for an “early kick” or “fly-over” but now allows for a “late kick” or “wing-slide” as well.
- Deduct 1 point for each ½ wingspan the pivot is completed outside the “Circle of Acceptable Error”

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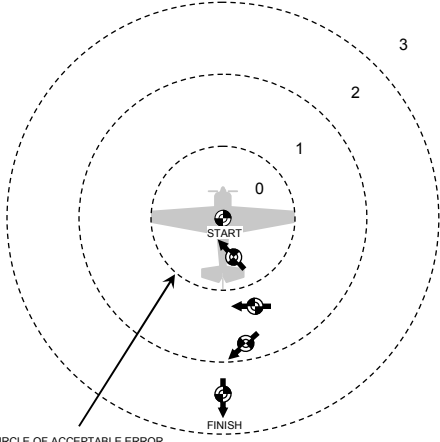
Judging Aerobatic Figures

Family 5 - Hammerheads (cont)



CIRCLE OF ACCEPTABLE ERROR


EXAMPLE OF AN "EARLY KICK" OR "FLY-OVER"
1 POINT DEDUCTION



CIRCLE OF ACCEPTABLE ERROR

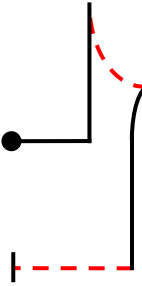
EXAMPLE OF A "LATE KICK" OR "WING SLIDE"
2 POINT DEDUCTION

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Judging Aerobatic Figures

Family 6 – Tailslides



Ex: 6.2.3


GRADING CRITERIA:

- > Identical radii of entry and exit ¼ loops (CGT)
- > Vertical up-line, slide, and down-line (ZLA), wings level
- > Rolls centered on up and down lines
- > Slide backwards at least ½ fuselage length for Power (for Gliders - just a visible slide): – zero if not
- > Falls in correct direction: – zero if doesn't
- > Falls with wings level in correct plane: – 1 point per 5° error

> No downgrade for pendulum after slide

> Altitude is not a grading criterion

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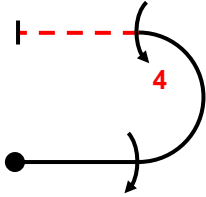
Judging Aerobic Figures

Family 7 - Loops and Eights

HALF LOOPS (7.1.x - 7.4.x)


GRADING CRITERIA:

- Constant radius (CGT) - Must be wind corrected!
- Horizontal flight-path (CGT) must be maintained at exit - 1 point per 5° of flight path error
- No visible lines between rolling and looping portions of the figure
 - Drawing a line [between a looping segment and an adjacent rolling element] requires a deduction of at least 1 point, depending on the length of the line drawn



Ex: 7.1.1
+ 9.1.3.4
+ 9.4.3.4

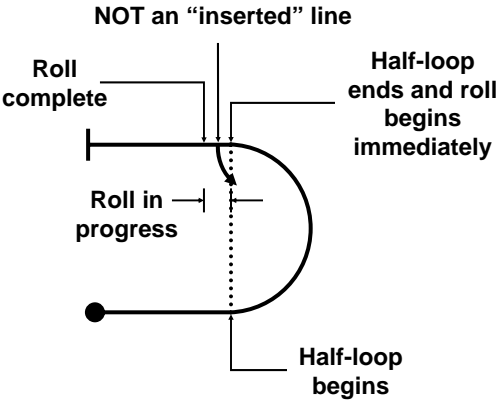
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HALF-LOOPS WITH ROLLS

DON'T BE TRIGGER HAPPY!

NOT an "inserted" line



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Judging Aerobatic Figures Family 7 - Loops and Eights (cont)

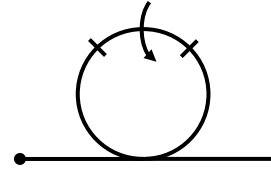
FULL LOOPS (7.5.x - 7.6.x)

GRADING CRITERIA:

- Wind corrected to have a constant radius (CGT must appear perfectly round to the judge)

Note: With any crosswind, the loop will not occur within same vertical plane and is not a judging criteria (no deduction should result as long as it appears round)

- If rolls are present, they must be centered about the apex - 1 pt per 5° of asymmetry
 - Minimum 2 point deduction for line during roll (must be integrated in loop)
 - Roll combination must be centered (not the pause between)



Ex: 7.5.1
+ 9.1.3.4



Judging Aerobatic Figures Family 7 - Loops and Eights (cont)

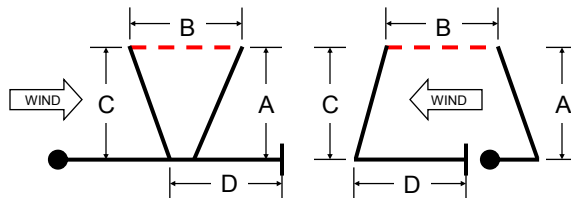
$A = B = C = D$ and $a = b = c = d$

HESITATION LOOPS (7.7.x - 7.10.x)

GRADING CRITERIA:

- 90° and 45° lines are judged on attitude (ZLA)
- Horizontal lines judged on flightpath (CGT)
- Identical line lengths, set by length of 1st 45° or 90° line
- Identical radii of all part loops (CGT)
- If rolls are present, they must be centered on the line

Examples of flight path of "perfect" square loops in different wind conditions:



Ex: 7.7.1

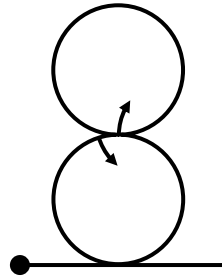


Judging Aerobic Figures Family 7 - Loops and Eights (cont)

VERTICAL S's and 8's (7.11.x - 7.18.x)

GRADING CRITERIA:

- Both loops must be round (wind corrected) and of identical radius (CGT)
- Loops must be one above the other unless there is a half roll between them
- Half rolls performed on a line but no line before or after (not integrated with the loop) – again, don't be trigger happy
- Entry and exit altitude must be the same



Ex: 7.16.1
+ 9.1.3.2
+ 9.1.3.2

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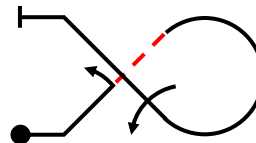


Judging Aerobic Figures Family 7 - Loops and Eights (cont)

PARTIAL 8's (7.19.x - 7.22.x)

GRADING CRITERIA:

- Identical entry and exit radii of 1/8th loops but may be different radii than the 3/4 loop (CGT)
- Entry and exit altitude can be different than the top and bottom of the loop (length of 45° lines bear no relation to the size of the loop)
- Any rolls on 45° lines must be centered



Ex: 7.20.1
+ 9.1.2.2
+ 9.1.2.4

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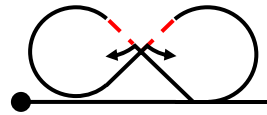


Judging Aerobatic Figures Family 7 - Loops and Eights (cont)

HORIZONTAL 8'S (7.23-7.30)

GRADING CRITERIA

- Identical entry/exit radii (CGT) of 1/8th loops but may be different from 3/4 loop radii
- Identical 3/4 and 5/8th loop radii and must occur at the same altitude (different altitude ok in gliders)
 - Entry and exit altitude *must be identical* (except in gliders) unless:
 - 7.23-7.26: there are *multiple* rolls on the final 45° line, or
 - 7.27-7.30: there are *multiple* rolls on the first 45° line
- Any rolls on 45° lines must be centered



Ex: 7.26.1
+ 9.1.4.2
+ 9.1.4.2
"Cuban-8"

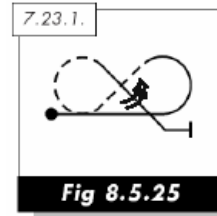


Fig 8.5.25
• Example of a 7.23 - 7.26 figure with multiple rolls on the last 45 degree line

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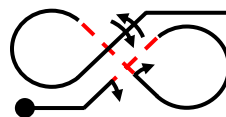


Judging Aerobatic Figures Family 7 - Loops and Eights (cont)

COMBINATION 8's (7.31.x - 7.38.x)

GRADING CRITERIA:

- Identical entry and exit 1/8th loop radii (CGT) but may be different from 3/4 loop radii
- Identical 3/4 loop radii (CGT)
- For Power Competition: Entry and exit altitudes and the top and bottom of the 3/4 loops must all coincide, except if there are multiple rolls on the first and/or last 45° lines, these lines may be extended but not shortened ("OK" dotted lines in Figure 8.5.26)
- For Glider Competition: There is no relation between entry/exit altitude and the altitude limits of the 3/4 loops so all 45 deg lines can be of different lengths.
- Any rolls on 45° lines must be centered (except snap rolls in gliders, see 8.4.1.e)



Ex: 7.35.1
+ 9.1.2.2
+ 9.1.2.2
+ 9.1.2.4
+ 9.1.2.4

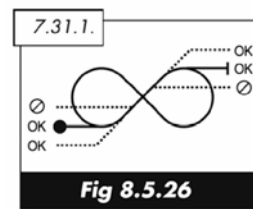


Fig 8.5.26
• Combination 8

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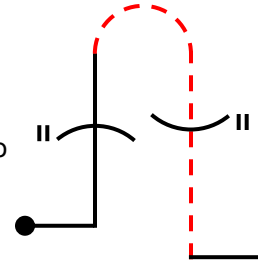


Judging Aerobatic Figures Family 8 - Combination of Lines, Angles and Loops

HUMPTIES (8.1.x - 8.28.x)

GRADING CRITERIA:

- Identical *entry and exit* loop radii (CGT)
- 1/2 loop must be constant (CGT) but not required to be identical to entry/exit radius
- Rolls must be centered on the line
- Entry and exit altitudes need not be the same
- Altitude gain/loss is not a grading criterion



Ex: 8.3.1
Pull-Push-Pull
Humpty

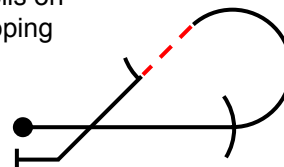


Judging Aerobatic Figures Family 8 - Combination of Lines, Angles and Loops (cont)

5/8 LOOPS (8.31.x - 8.32.x, 8.41.x - 8.42.x)

GRADING CRITERIA:

- Radii of all looping portions must be identical, including entry/exit radius (CGT)
- Roll must be centered on the 45° line
- No visible line between looping portion and rolls on horizontal lines preceding or following that looping portion
- Altitude gain/loss is not a grading criterion



Ex: 8.42.1
Basic figure for "Half-Cuban"



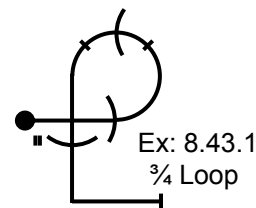
Judging Aerobic Figures Family 8 - Combination of Lines, Angles and Loops (cont)

7/8 LOOPS (8.29-30.x, 8.35-36.x, 8.45-46.x, 8.53-54.x, and 8.57-72.x)

3/4 LOOPS (8.33-34.x, 8.39-40.x, 8.43-44.x, 8.51-52.x)

GRADING CRITERIA:

- Identical radii of all looping portions (CGT)
- No visible line between looping portion and rolls preceding or following that looping portion – again, don't be trigger happy
- Rolls must be centered on 45° and vertical lines
- Rolls at the apex of a 3/4 loop must be centered
- Altitude gain/loss is not a grading criterion



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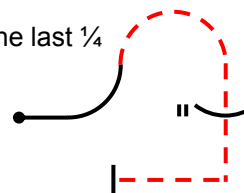


Judging Aerobic Figures Family 8 - Combination of Lines, Angles and Loops (cont)

COMBINATION LOOPS (8.49.x, 8.50.x, 8.55.x, and 8.56.x)

GRADING CRITERIA:

- Identical radii of all looping portions *EXCEPT* the last 1/4 loop to horizontal (CGT)
- Rolls on the vertical line must be centered
- Altitude gain/loss is not a grading criterion



Ex: 8.50.1

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Judging Aerobatic Figures Family 9 - Rolls and Spins

GENERAL GRADING CRITERIA FOR ALL ROLLS (SLOW ROLLS, SNAP ROLLS, AND SPINS):

- Constant rate of rotation (except spins)
- During the slow rolls and snap rolls, aircraft must continue to project the prescribed plane of rotation and direction of flight (CG tracks a straight line)
- Stops precisely after stated number of rotations
- Linked rolls must be flown as one continuous figure
- Unlinked and opposite rolls must have a brief but perceptible pause between the rolls

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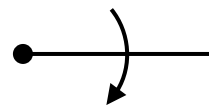


Judging Aerobatic Figures Family 9 - Rolls and Spins (cont)

SLOW ROLLS (9.1.x.x) SUPER SLOW ROLLS (GAF 9.13.x.x)

GRADING CRITERIA:

- Constant roll rate: – 1 point per variation
- No roll stoppage: – zero if can be considered a hesitation roll
- Aircraft should continue to project the same plane of rotation and direction of flight during the roll
- Aircraft attitude in horizontal rolls is not a grading criterion (must change to maintain level CGT)
- THE GLIDER SUPER SLOW ROLL is judged by the same criteria
 - Roll timed by the Chief Judge
 - Not less than 10 sec per 360° roll




Ex: 1.1.1
+ 9.1.3.4

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Judging Aerobatic Figures

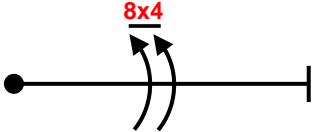
Family 9 - Rolls and Spins (cont)

HESITATION ROLLS (9.2.x.x - 9.8.x.x)


GRADING CRITERIA

- Constant rate of roll and rhythm: – 1 point for visible variation
 - Hesitations must be of identical duration
 - Hesitations must be recognizable – zero if no point is seen
- Correct degree of rotation between each hesitation: – 1 point per 5° of error at hesitation

Ex: 1.1.1
+ 9.4.3.8



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Judging Aerobatic Figures

Family 9 - Rolls and Spins (cont)

SNAP ROLLS (9.9.x.x - 9.10.x.x)


GRADING CRITERIA:

Ex: 1.1.2
+ 9.9.8.4



- Nose departs the flight path in correct direction:
 - Positive (inside) snaps – nose moves towards canopy
 - Negative (outside) snaps - nose moves towards wheels
 - Zero figure if nose moves wrong direction
- Aircraft begins to “auto-rotate” just after or simultaneously with nose movement:
 - Deduct 1 point per 5° of roll and/or yaw observed before the nose pitches
- Constant rate of rotation and plane of rotation:
 - Deduct 1 point per variation of “character” (e.g., rate of rotation or nose moving more onto the flight path, etc.)
 - Identical attitude before starting and in the instant of stopping auto-rotation
 - However, “buried the snap” is not a criteria
- Aircraft exits auto-rotation after required degree of roll:
 - Deduct 1 point per 5° of rotation remaining when auto-rotation stops

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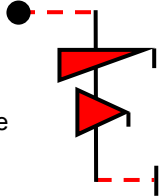
Judging Aerobatic Figures

Family 9 - Rolls and Spins (cont)

SPINS (9.11.x.x - 9.12.x.x)


GRADING CRITERIA:

- Horizontal flight path before stall (CGT)
- At stall, nose must fall simultaneously with wing drop (roll) and yaw in direction of spin (all three axes simultaneously), otherwise deduct 1 point per 5° of deviation observed before the stall
- Aircraft remains in auto-rotation until stopped on prescribed heading: – deduct 1 point per 5° of under or over-rotation
- Establishes 90° vertical down line (ZLA), wings level attitude after stopping on heading: – deduct 1 point per 5° of error
- If a roll follows the spin, there should be brief but perceptible pause between the spin and the roll (unlinked roll rule)
- Constant ¼ loop radius to horizontal flight (CGT)
- Pitch attitude in the spin and rate of auto-rotation are not grading criterion (i.e., the spin may be oscillatory)



Ex: 1.6.4
+ 9.12.1.4
+ 9.10.5.4

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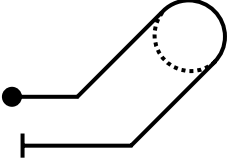
Judging Aerobatic Figures

Family 0


WINGOVER (0.0)

GRADING CRITERIA:

- Coordinated turn begins immediately after climb initiated
- Heading at top of climb 90° off original heading and wings perpendicular to horizon at top of climb: – deduct 1 pt per 5° of heading or attitude deviation
- Second half of turn is on descending flight path
- Rate of turn and roll must be constant - 1 point per variation
- Any stoppage of turn or roll during figure - 1 point per stoppage



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Judging Aerobatic Figures Family 0 (cont)

QUARTER-CLOVERS (0.1 and 0.2)
GRADING CRITERIA:

0.1 Quarter-Clover:

- Roll begins simultaneous with pitch up
- Roll integrated with 1st half loop such that the aircraft reaches the top of the loop inverted with fuselage horizontal and wings level with the horizon, 90° from the start direction – deduct 1 pt per 5° deviation in attitude or heading

0.2 Quarter Clover:

- Roll begins immediately upon reaching the apex of the loop
- Roll integrated with 2nd half loop such that the aircraft reaches the bottom of the loop in wings-level horizontal flight, 90° from the start direction – deduct 1 pt per 5° deviation in attitude or heading

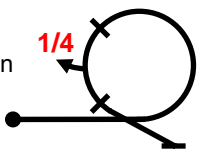
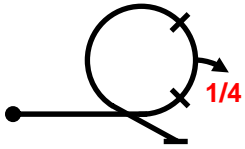
For both Figures:


- Roll rate must be constant – deduct 1 pt per variation
- Start and finish altitude must be equal
- Loops must be round (CGT)

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“A” is for AVERAGE

- Mark the figure as “A” if you miss seeing a figure, or any part of a figure such that a grade cannot be given with FULL confidence
- Not a sign of failure - more fair than “faking” it
- “A” grades set aside when assessing majority rule of zero (0.0) grades
- “A” grade calculated by scoring program (average of majority non-zero grades)

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Grading Judge Zeros 7.3.1 (a) – (e)

- a) Omitting a figure in the program
- b) Adding a figure unless it is to correct heading or attitude, in which case an interruption penalty will be given (see 4.16.3.c)
- c) Flying a figure that deviates from that on Form B or C, whichever is in use for the flight
- d) Flying a figure in the wrong direction on the X axis
- e) Any cumulative deviation of 50° or more on roll, pitch, and/or yaw axes (error of 20° roll, 10° pitch, and 20° heading in the same figure would be a zero)

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Majority Rule (7.3)

- Used for every figure graded, including positioning
- Majority zeros (more than 50%) result in remaining non-zero grades changed to zero automatically by the scoring software
- Minority zeros (50% or less) will be changed to the average grade of the majority judges automatically by the scoring software
- Chief may conference Judges when there is a mixture of zero (0.0) and non-zero grades AND the Chief Judge believes the Judges had problems correctly assessing the facts:
 - ✓ No conference permitted if there are unanimous 0.0 marks.
 - ✓ One of three possible revision of grades after a conference of the facts:
 1. They may leave scoresheets as originally marked
 2. They may revise their mark downward to zero (0.0); or
 3. They may revise their zero (0.0) mark to a "C" (Conference Average) to signify that their mark resulted from a conference discussion of the facts

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Chief Judge Zeros 7.3.1(f) – (k)

- f) Any figures flown entirely outside the box prior to initial entry
- g) Any figure started behind the Judges line
- h) Any figure or part of figure flown over the deadline
- i) Super Slow Roll (Gliders) flown faster than 10 seconds per 360° of roll
- j) Any figure interrupted for a technical fault ruled to be invalid (see 4.18.3)
- k) Contest Jury will zero any figure from a Free program which the Jury found to be illegal after becoming “final” (see 6.15 and 6.16)



Presentation Score Judging Criteria (8.6)

GRADING CRITERIA:

- Sequence should achieve a sense of balance between the left and right of the Y-Axis but not required to use entire box
- Sequence should be flown in a manner that presents each figure at its optimal viewing distance and angle
- Sequence should be harmonious by clearly separating individual figures but each following the one before at similar intervals in time
- Grade must take into account the placement of individual figures, the balance of the sequence as a whole, and the harmony of execution
- Judges must apply presentation criteria in a consistent manner to every pilot flying the program



Unlimited Four-Minute Freestyle Judging Criteria (5.6.8)

- **4-Minute Freestyle:** Created by each Unlimited competitor who chooses to enter this optional and separate trophy event
 - Figures do not have to come from the Aresti Aerobatic Catalogue
 - Grading criteria different than for the other contest flight

GRADING CRITERIA:

- **Technical Merit (160K):**
 1. Complete use of Flight Envelope (40K)
 2. Exploitation of Aerodynamic & Gyroscopic Forces (40K)
 3. Execution of Individual Maneuver Elements (40K)
 4. Wide Variety of Figures Flown on Different Axes and Flight Paths (40K)
- **Artistic Impression (160K):**
 5. Pleasing and Continuous Flow of Figures (40K)
 6. Contrasting Periods of Dynamic and Graceful Maneuvers (40K)
 7. Presenting Individual Figures in their Best Orientation (40K)
 8. Presenting Individual Figures in the Optimal Position (40K)
- **Positioning (80K):**
 9. Symmetry (40K)
 10. The Performance Zone (40K)



Rulebook Change Process

- Send proposals for Rule Changes to the Rules Committee Chair by 01 April
- Rules Committee deliberates on proposals and decides which to forward to membership for comment.
 - Deadline for member comment is 1 October
- Rules Committee recommended Rule changes forwarded to IAC Board of Directors for approval at Fall BoD Meeting



How Scores are Computed

- JASPER (Straight Average Method) Adopted in 2005 for Regional Contests
 - IAC Owned (donated) S/W written in “JAVA”
 - ALL marks used (no discarding of high/low marks) and then averaged
 - *No capability for producing Judge Performance Indices (JPI) for Feedback and Training of Judges*
 - Very strong interface with Online Contest Results and IAC Judge Databases!
- Fair Play System (Statistical Processing Method) – used ONLY at the U.S. National Championships, where the CIVA Software is used
 - statistical based processes instituted in 1978 to address intentional and unintentional judge bias - updated periodically with numerous improvements
 - IAC Approved statistical based S/W was MS DOS Based with cumbersome user interface and S/W maintenance issues - abandoned in 2005 in favor of JASPER
 - CIVA maintained ACMS S/W is Windows Based; outdated algorithms were modernized in 2005, Judge Performance Indices (JPI) added in 2004
 - Either S/W required familiarity for efficient use
 - *Judge Performance Indices (JPI) incorporated in CIVA Software*



Straight Average Scoring Should it Matter to Judges?

- Judges MUST NOT let opinion of scoring method impact their application of the criteria to determine grades!
 - Pilot’s final score on each figure will be the average ALL judges scores (high and low scores ARE NOT discarded)
 - With straight average scoring, scores significantly different (high or low) from other judges may have a larger impact on the outcome than in statistically based scoring systems
- So it is very important that:
 - Judges MUST BE ACCURATE in applying the criteria and deduct from “10” in 0.5 pt increments to arrive at the correct grade
 - Judges MUST NOT CHANGE their method of grading to avoid being the “outlier”




THE TEN COMMANDMENTS OF GRADING

The Standard Is Perfection

- Be Fair**
- Be Ethical**
- Be Consistent Competitor-to-Competitor**
- Give the Benefit of the Doubt**
- Be Accurate in Applying Criteria - Don't Get in a Rut**
- If You Didn't See Anything Wrong, It's a 10**
- Avoid the HALO effect**
- Don't Adjust For Difficulty**

GRADE ONLY WHAT YOU SEE!

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Next Steps - - - - -

- ✓ Pass the Regional Judge Exam (80%)
- ✓ Assist a *Grading* Judge:
 - 40 flights total
 - 10 flights in Advanced or Unlimited
- ✓ Then Pass the Practical Exam

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