

Newsletter of The River Valley Flyers

Club #948

July 2018

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|---|-----------------------------|
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**From the President and Editor:** Even though it has officially just started, the summer seems to be flying by. There are always a lot of things to do in the summer season, and I'm hoping that getting out to fly is one of them. Starting in early June, we again have scheduled club night on Monday evenings at the flying field. It is a night to get out and fly with, and also get to know fellow club members. If you need help, or have questions about anything flying related, I'm sure they can be answered by fellow modelers.

Please join us on Monday evenings this summer from 5:00 till dark for club night.

The flying field is looking to be in good shape this year, thanks to the effort of those who have helped with the mowing and maintenance so far this season. Thank You to all involved for all the effort you have given. It is just nicer to fly from a properly groomed field.

Because of the holiday, the July monthly meeting will be moved to Monday evening, July 2<sup>nd</sup> and not on Wednesday July 4<sup>th</sup>. We'll have a short meeting after club night at the field on Monday evening, hope to see you there.

Don

# Wing Angle of Attack

*Written by Scott Stoops*

*Flight Training Column*

*As seen in the February 2013 issue of Model Aviation.*

On a trip with family and friends to Mexico, we were lucky enough to end up in the last row of coach for the four-hour flight. Sitting across the aisle from a family friend, he queried as to why it seemed as though we were severely tilted nose-up, even in cruise flight. In my typical wordy fashion, I proceeded to outline the basics of flight and specifically the angle of attack (AOA).

Seeing his eyes glaze over after a minute or so, I decided that this column would make a better vehicle for that discussion. Let's explore AOA, some common misunderstandings new pilots have about stalls, and some common recovery techniques. Let's start from the beginning.

Wings create lift. They do this primarily by manipulating the AOA. AOA is the difference between the chord line and the flight path or relative wind of a wing. Not unlike sticking your hand out the window of a car with it tilted slightly up, a wing creates down force through both its shape, but primarily, the angle it addresses the oncoming air. This is AOA (see Figure 1).

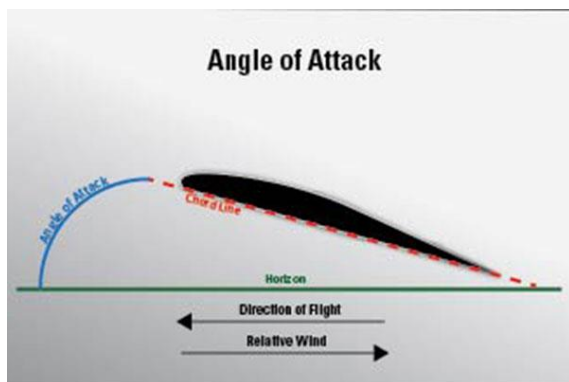


Figure 1

Although the basic shape of the airfoil contributes to the efficiency of the wing and its ability to create lift, the primary factor in lift creation is AOA. Based on the design of the wing and airfoil section, there is a maximum AOA at which the wing section will continue to produce lift. Flight beyond that AOA causes the

airflow to become extremely turbulent and detach from the upper surface of the wing. This detachment results in a loss of lift, or a stall. The specific stalling AOA is a constant for that particular wing.

Stalls have absolutely nothing to do with a power failure of the motor or engine. In fact, unpowered aircraft such as sailplanes can also stall. Stall is an aerodynamic term that only relates to exceeding the critical AOA.

During normal flight in most types of airplanes, we avoid flying the aircraft at or close to the critical AOA. It is, however, important to be familiar with the stalling characteristics of your model. Learning to stall your model allows a higher level of awareness of the energy state of the airplane with regard to AOA. Practice is the only way to become familiar with and competent at stall and recovery.

For the airplane to stall, an AOA that exceeds the critical AOA must exist (see Figure 2). In the case of practicing stalls, the best place to start is from level flight with plenty of recovery altitude. You can intentionally stall the aircraft by increasing the elevator input and holding it in an increasing pitch attitude while reducing the power of the motor.

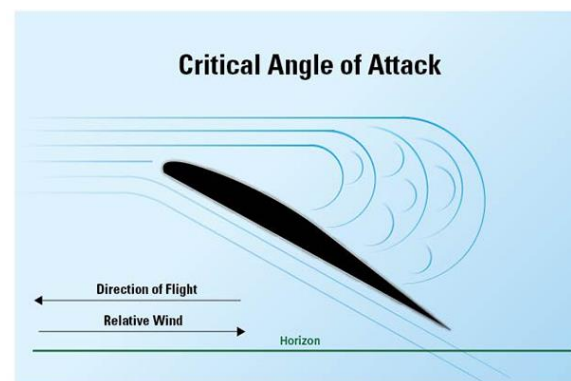


Figure 2

As the aircraft exceeds the critical AOA, airflow over the wing will "detach" from the wing's upper surface, causing some buffeting and usually a pronounced pitching moment toward a nose-down attitude. Most models have a critical AOA of approximately 17°. Recovery is simple, but not instinctive.

With the nose now pointing slightly down (probably below the horizon), you must reduce the up-elevator input to let the wing recover to a flying AOA. This is not instinctive, because in

normal flight we would apply up-elevator when the nose is below the horizon to correct for level flight.

In stalled flight, it is critical to allow the wing to start flying again by lowering the AOA even further. Often, simply releasing any elevator input back to neutral is enough to get the recovery started. This reduction in AOA generally coincides with an increase in thrust and, once the wing is no longer stalled, a gentle correction back to level flight.

## Stalls in All Attitudes

Now for the confusing part! The previous example was for level, decelerating flight. Stalls occur when the critical AOA is exceeded, which means they can occur in any pitch attitude. A stall can occur when the aircraft is pointing straight up, straight down, inverted, or at any pitch attitude as long as the critical AOA is exceeded. This is generally tied to a large elevator input but can also occur with small inputs at higher speeds.

A stall can occur at any airspeed (it is not necessarily a slow speed event, but rather, a high AOA event). This can be confusing to new modelers, because the traditional diagrams of the stalling AOA depict an aircraft in level flight as I have explained.

A model can be stalled going straight up in a loop. If the pilot pulls too hard on the elevator control stick (displacing the elevator up), the critical AOA can be exceeded and the wing will stall while the airplane is pointing straight up. The same is true if the pilot pulls too hard on the elevator during the backside of a loop while pointing straight down.

A good indicator that the model's AOA is near the critical AOA is the position of the elevator. For the AOA to be high, the elevator has to be significantly displaced. So, wings stall at a specific AOA, not at a specific pitch attitude (see Figure 3).

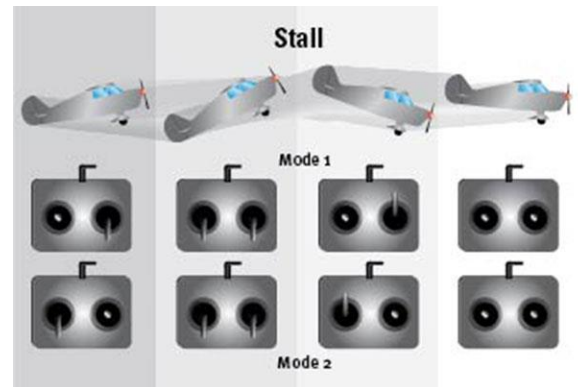


Figure 3

## 3-D Flight

The next logical question would be how 3-D airplanes can be flown beyond the critical AOA if lift significantly decreases when the wing stalls. The simple answer is thrust. They use thrust to replace the lift lost from the stalled wing.

If you'll note, most 3-D airplanes have dramatically oversized flight controls and optimized airfoils that allow full control through thrust vectoring and clean transition in and out of stalled flight. As your skills improve, consider learning some of the basics of 3-D flight, because it can only make you more comfortable flying at AOAs around and even beyond the stall!

## Take-Away

Although it can be scary to slow your model to the point where you're uncomfortable with how it is going to perform, learning stalls and stall recovery is critical to becoming a well-rounded RC pilot. Start high, and with a buddy box if necessary. Most importantly, remember that simply releasing the elevator input will often allow the model to recover on its own!

In the columns going forward, I'll do my best to further explore stalled flight through some 3-D maneuvers as well as snap rolls and spins, so give the basic stall a try.

Fly safely, and remember that learning is fun, and fun is what this great hobby is all about.

-Scott Stoops

## From Our Safety Officer

Hello fellow flyers,

Just a moment for some thoughts about the AMA Safety Code. I know this is a boring subject but maybe you would rather review it from your hospital bed, huh? Please remember that these vehicles we send aloft weighing anywhere from 2 to 55 pounds will, one way or another, return to earth and some of them will create a rather large hole in the ground! Section B paragraph 1, is there to prevent the machine from crashing onto people or vehicles parked nearby. I mention this after witnessing numerous violations of this. I'm not going to get long winded here but I encourage you to review the following excerpt from the AMA. Thanks for your time and I hope to see you at the field, not the hospital!

### B. RADIO CONTROL (RC)

1. All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others.
2. A successful radio equipment ground-range check in accordance with manufacturer's recommendations will be completed before the first flight of a new or repaired model aircraft.
3. At all flying sites a safety line(s) must be established in front of which all flying takes place. (AMA Document #706.)
  - (a) Only personnel associated with flying the model aircraft are allowed at or in front of the safety line.
  - (b) At air shows or demonstrations, a straight safety line must be established.
  - (c) An area away from the safety line must be maintained for spectators.
  - (d) Intentional flying behind the safety line is prohibited.
4. RC model aircraft must use the radio-control frequencies currently allowed by the

Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.

5. RC model aircraft will not knowingly operate within three (3) miles of any pre-existing flying site without a frequency-management agreement. (AMA Documents #922 and #923.)

6. With the exception of events flown under official AMA Competition Regulations, excluding takeoff and landing, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and the pilot's helper(s) located at the flightline.

7. Under no circumstances may a pilot or other person touch an outdoor model aircraft in flight while it is still under power, except to divert it from striking an individual.

8. RC night flying requires a lighting system providing the pilot with a clear view of the model's attitude and orientation at all times. Hand-held illumination systems are inadequate for night flying operations.

Larry Chamberlin  
Safety Officer RVFRC

## **RVF Club Nights on Monday Evenings at the Club Field**

Club Night will resume for the summer season and will be on Monday evenings from 5:30 till dark. It is an evening of flying together and help to anyone who needs a hand getting started. Flight Training will also be available if needed. If the weather is bad on Monday evening [high wind or rain] it will not take place till the following Monday.

## **Upcoming Area Events**

### **July**

**7/21/2018** -- Abbotsford, WI (C) FUN FLY.  
Site: Club Field. David Williams CD PH:  
715-678-2826  
Email: [sw704820@gmail.com](mailto:sw704820@gmail.com). Sanction  
#18/1283. Location; 5552 Rose Dale Ave.  
Sponsor: HOBBYLAND FLIERS

**7/22/2018** -- Mackville, WI (C) VALLEY  
RC INVASION 2018. Site: W 5007 Quarry  
Rd. Tim Miller CD PH: 920-740-3250  
Email: [trmillerdragracing@yahoo.com](mailto:trmillerdragracing@yahoo.com).  
Visit: [flyvam.com](http://flyvam.com). Sanction #18/954. All  
RC aircraft welcome. Fun fly 9am-2pm.  
Main runway for fun flights all day, FPV  
course in dedicated area. noon flight.  
Sponsor: VALLEY AERO MODELERS,  
INC

### **August**

**8/4/2018** -- Stratford, WI (C) 17TH  
ANNUAL DICK STRAND FUN FLY. Site:  
Club Field. Joseph Mayer CD PH: 715-687-  
4147 Email: [josephwmayer@charter.net](mailto:josephwmayer@charter.net).  
Visit: [msaero.com](http://msaero.com). Sanction #18/661.  
Location; 1 1/2 miles North of Stratford on  
Hwy 97 N to Rock Rd then East 3/4 miles  
on south side of the road. 600x150' Runway  
open all around. All types of airplanes  
welcome. Food, drinks, and prizes. Sponsor:  
MID-STATE AEROGUIDANCE

**8/11/2018** -- Wausau, WI (C) WAUSAU  
RC SPORTSMAN FUN FLY-IN. Site:  
Sunnyvale Park. Robert Weller CD PH:  
715.842.1755  
Email: [bweller@wellertechnology.com](mailto:bweller@wellertechnology.com).  
Visit: [wausuarcsportsmen.org](http://wausuarcsportsmen.org). Sanction  
#18/159. \$5 Pilots fee, food, refreshment,  
raffle. Flying from 8am-3pm. Free to  
spectators. Sponsor: WAUSAU RC  
SPORTSMEN CLUB

## **River Valley Flyers July Meeting Notice:**

**Due to the July 4<sup>th</sup> holiday, the  
July RVF Monthly Meeting  
will be moved back a few days  
to July 2nd**

**When: Monday evening, July  
2<sup>nd</sup> after Club Night around  
7:00 P.M.**

**Where:  
At the Club Flying Field**

**Bring something to fly  
beforehand. If it rains that  
night, we will reschedule for  
another night**