



AMA Charter #3470
Club Newsletter September 2005

MEETINGS: Next meeting will be on Wed September 21st at The Flying Field. Meeting at 7:00. Come early to fly.

A Note From The President

The Caldwell Aero Modelers have added another member to the ranks. Please welcome Kay Bumgarner. Kay is a past member of the club when the field was in Hildebran. We now have 31 members in the club.

I want to thank George Herr for mowing the field Labor day weekend. Since gas prices are up, George offered to mow the field for Jason. It is a 35 mile round trip to the field for Jason. It does not make economical sense for Jason to mow the field and not even cover his gas bill. Thank you, George for mowing gratis.

I should also mention, we have had several visitors to the Caldwell Field. A group from Boone came and flew at the field. They had come down for the fly-in and wanted to return. I'm looking forward to making a trip up to their field sometime soon. We also hosted a modeler from the King RC Club. He was camping in Mortimer and wanted to fly. He scratch built an electric 4-star 60 and really knew how to fly it!

The only other thing I can think to mention is the monthly meeting. I'm looking forward to a good turnout. We'll start the meeting at 7:00, but let's plan to fly before the meeting starts.

See you Wednesday, September 21 at 7:00 for the meeting.

Thanks
Seth H. Nagy
President, CAM

Up Coming Events

October 28-29 Warbirds over NC. WHAM and Giant Scale Warbirds Association Co-sponsored event at WHAM field.

Dihedral—How Much is Enough?

Like most things in the aerodynamic world, the answer to the above question is, "It depends."

It depends upon what you want from your plane; how maneuverable or how stable you wish it to be in the rolling axis, whether or not you desire the plane to roll when you deflect the rudder, whether or not you wish the plane to tend to self-right when it upsets from wings level.

In general, the more dihedral an aircraft has, the more it will tend to self-right to wings level when upset from straight and level flight. This little bit of roll stability makes the plane easier to fly because the pilot doesn't have to be constantly fighting to maintain wings level. Note the top two drawings in the figure. Once we are no longer level, the lower wing is effectively a bit longer, and the lift forces on the lower wing are pointed more straight up. Also, since the figure shows a high wing plane, the CG of the plane is offset toward the high wing. All of these situations tend to force the plane back to a wings level condition initially, before the plane begins turning or skidding sideways.

But the conditions described above won't last long. Also note that we now have the lift forces on the higher wing pushing sideways; this will cause the

plane to skid sideways, turn or both. Assuming no corrections from the pilot, what now happens is largely dependent upon the size of the rudder/fin combination! If the fin/rudder area is just right, the skid continues just enough for the dihedral effect of the wings to return us to wings level. Too much area in the fin/rudder, and we turn without skidding. Centripetal force from the turn negates all the self-righting effects, and we fly in balanced flight, but in an ever increasing nose-down spiral. This is called spiral instability. Too little fin/rudder area, and the skid continues even as we pass wings level, resulting in over correction, and the plane rolls and skids, oscillating like a drunken sailor. This is called Dutch roll.

Although the above discussion is more important to glider and free flight pilots, it brings us to look at how dihedral effects a plane in skidding flight, and the good and bad sides of the dihedral effect. Note in the figure what happens to a plane with dihedral when in a skid or unbalanced flight. This condition can occur with the pilot's deflection of the rudder or when a wind gust hits the plane from the side. The large discrepancy in angle of attack between the two wings causes the plane to roll away from the direction of the skid. The dihedral effect is beneficial in self righting, gives us roll coupling with rudder application, and unfortunately, also gives us roll away from a side wind gust. Incidentally, sweeping a wing back also gives us dihedral effect, with about 5 degrees of sweep being equivalent to 1 degree of dihedral.

While roll coupling is essential to a trainer with no ailerons, it's not good for aerobatic and combat aircraft. Most

aerobatic and pattern models will have no dihedral. Military planes, with swept wings for speed, often use negative dihedral to counter the dihedral effects from the wing sweep. The Harrier, A7 Corsair and C5 transport come to mind.

And while trainers usually have quite a bit of dihedral and are wonderfully stable in normal flight, we've all seen them turn vicious in a gusty crosswind, during takeoff and landing and even while taxiing on the field.

How much dihedral is enough? For most of us, then, the answer is, "Only enough to give us the roll stability we need, commensurate with our flying skills!"

Article collected from AMA national newsletter.

Word Search Model Airplane Terms

Z W I M R O C A P J F D Z L W
 D Y O U E N M A G A O E E A H
 P W Z N L E O L N R L E R T E
 Q J N R L S O R H O H F E S E
 Y G Y U E W L S E W P G C Y L
 Y D K R P T U H L L B Y E R E
 O L V L O P T I D U I K I C E
 H O U G R E A I J I C A V M F
 P G C G P T L R M V Q F E K G
 F U S E L A G E V S N A R C V
 K N A T L E U F V G N I W I L
 R A E G G N I D N A L A J I B
 V Z K R U D D E R C T C R D K
 Y H T I E X J H Z N I O H T A
 T V E C I W C Q L U S W R O L

AILERON	CANOPY
CRYSTAL	ELEVATOR
FLAP	FUELTANK
FUSELAGE	GLOWPLUG
LANDINGGEAR	PROPELLER
PUSHROD	RECEIVER
RUDDER	SERVO
TAILWHEEL	TRANSMITTER
WHEEL	WING