BEES BREEZE

RC BEES of Santa Cruz County, Inc.

AMA Chapter 144

Newsletter July 2018

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Next meeting

Thursday, July 19th, at the EAA building, Aviation Way, Watsonville Airport, 7:30 p.m.

June Meeting

The monthly meeting was held on June 21st at the EAA building in Watsonville with nineteen members present and new member, Jarmon Lynch. Welcome, Jarmon!

Steve Boracca presided and opened the meeting promptly at 7:30 p.m. The minutes of the previous meeting were approved, as was the treasurer's report which can be seen on the members' section of our web-site.

Dan Morris confirmed that there would be a fun-fly on June 24th, the Sunday following the club meeting. Events would include the usual triple loops, 15 second climb and glide, carry a spillable item for one circuit of the field, bowling, etc., Secretary Alan Brown would put out a separate detailed notice of the sequence of events two days prior to the event.

Show and Tell

Again there was no real Show and Tell this month as the time was dominated with selling off a lot of models and kits brought in by various members. Michael Hushaw had brought in a couple of EDF powered jet the previous month, and they were sold. Here they are again, great buys for someone.

Ken Singleton donated a box of plastic model kits, and Jesse Gifford brought in two kits from our ex-president, Bill Moore's collection, a Thunderbird and a Kougar. Older members will remember the two latter as fine sports/pattern airplanes. Alan Brown brought in another station wagon full of Member John Nohrden's collection, and sold some of the items, still a lot to go.

Here's the crowd round the plastic kit box.

And with that the meeting was closed at 8:30 p.m.

Down by the River

The highlight for the month was the fun-fly on June 24th. A notice detailing events was sent to RC Bees members a couple of days in advance, essentially confirming what had already been sent out by Dan Morris. Here it is repeated for the record. A key feature of this type of competition is that the same aircraft must be used for all events. You will also note that in every case, the airplane is required to take off from the runway and land successfully. This puts a premium on design and flying skills to come up with an airplane which can perform several different types of competitive flight.

1. Spot landing. A chalk line will be drawn cross-wise on the runway. Airplanes will take off, make a circuit of the field, and return with some part of the airplane touching down on the runway as near as possible to the chalk line.

2. Triple loops. Airplanes will take off, perform three consecutive loops and land back on the runway. The winner will be the one who performs this maneuver successfully in the shortest time from take-off release to touch down.

3. Spillable item. A flat piece of board about 8 inches long will have a paper cup attached to it, filled with either liquid or beans of some sort. It will be attached to the entrant's model with rubber bands. The requirement is to take off, complete a circuit and land with the minimum spillage, as defined by the event conductor.

4. Maximum duration from a 15 second motor run. Airplanes will be timed from take-off for a 15-second climb, at which point they must shut off the motors and glide back to the runway. Total time of flight to first touchdown will determine the winner. In the event that the airplane does not reach the runway, a penalty will be assessed.

5. Slalom taxi. Cones will be set up on the runway centerline, about 40 feet apart. Starting behind a line on the runway, competitors will drive their airplanes on a slalom course, round the extreme cone and back to the starting line in the shortest time without leaving the ground.

6. Bowling. A small plastic bowling set with nine pins will be set up on the runway centerline. Airplanes will take off, complete a circuit, and attempt to knock down as many pins as possible via a plastic ball trailing behind the airplane. Three circuits will be allowed.

Note that in every case, airplanes are required to take off from and land on the runway.

Mother Nature did not cooperate very well on the day, with a very strong cross-wind blowing in from the north. This meant that the spillable item event was deemed to be impractical, and the bowling event was also cancelled. So we were down to four events, for which we had eight courageous entrants, some of whom had never entered an event of this kind before.

Here's Don Edwards' airplane setting off for the slalom taxi event, which was held first.

He was followed by a veteran of this kind of event, Marcelo Montoreano, with his biplane which has

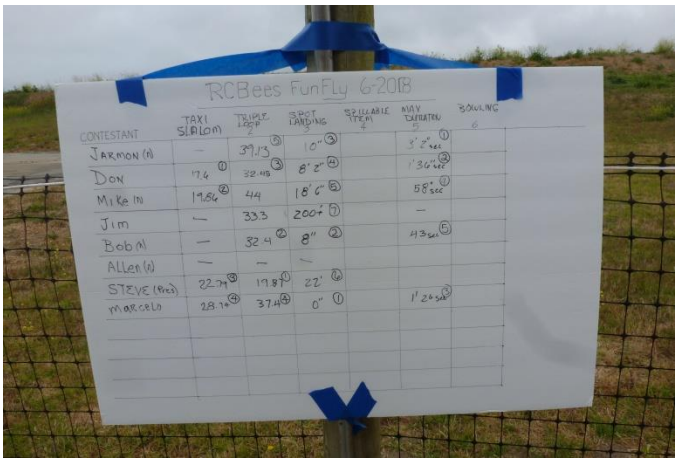
been seen in several of these competitions in the past.

And here's the same airplane in the spot landing event.

Everyone wasn't quite as fortunate!

Back to the slalom with new entrant Michael Hushaw's E-Flite UMX STOL airplane, a very good choice for this event, complete with airborne camera!

Of the eight entrants in the event, four were very recent new club members. As some were not necessarily conversant with the take-off and landing rules, our contest director, Dan Morris, did not enforce this rigorously, and some hand launches were allowed. The important thing is that everyone enjoyed themselves; Dan kept a running record of the event so that everyone could see where they stood throughout the competition.



The final standings had Don Edwards in first place, with 28 points, followed closely by Marcelo Montoreano, with 24 points. Jarmon Lynch, who just joined the club on the day, and Bob Frogner tied for third place with eighteen points. A good time was had by all!

Here are the first and second airplanes:

Your editor has been so busy trying to sell old airplanes that he hasn't seen or photographed any new airplanes at the field recently. However, he has had some help, much appreciated, in a rare field appearance by Max Trescott with his new Cirrus. Max is working hard on writing a new book, and Laurie took this picture of him holding his Christmas present, finally brought to the field!

This is a very pretty and nice-flying airplane – president Steve Boracca has one just like it – and Max loves it.

However, back to selling old airplanes. As most of you will know, old member John Nohrden has finally decided at age ninety nine, to get rid of his R/C model airplane collection, and your editor has been helping out. Here are two of his planes that are now in the Alan Brown collection. The first is a Great Planes ElectroStreak, which came out when electric propulsion was still very much in the minority. Here it is, just about ready to go. It should be a pleasant sports/pattern airplane. Light and not too fast.

The other is a semi-free flight Rascal. I fell for that nice elliptical wing with moderate dihedral, and no ailerons, and felt that I could kick back and watch it fly itself – or almost!

My final excursion into John's collection was to rescue a few old electric motors from fuselages not in the best of shape – I'm hoping that the motors still work - and then try to think about what to put them in. Three of the motors are almost identical Suppo's with 6" propellers, so I have to look for an interesting three-engined airplane about the right size for the motors.

Well, Pat Tritle has a nice Ford Trimotor which is the right size, so that looked like a possibility, but I unearthed an old article for a Farman Jabiru, a French commercial airplane of the early nineteen twenties – irresisitible!

It was flown by Danish Airlines; wouldn't you love to be the pilot. He's sitting half inside the wing behind the center engine!

The airplanes mentioned are all tail-draggers, which brings to mind some of the occasional discussions we see in the modeling press about these airplanes versus those with tricycle gear. So here goes with another Aero 101 on that subject.

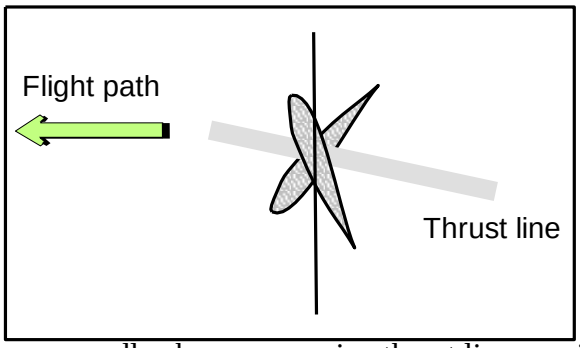
Left turns at takeoff

Propellers which spin anti-clockwise when viewed from the front generate forces which frequently cause aircraft to veer leftward while taking off. As there are at least three different phenomena at work during this operation, I thought it might be useful to categorize them, and to look at some of the techniques used to counteract them.

The first phenomenon is the torque generated by the engine. Newton's laws about action and reaction tell us that there will be equality between the turning moment generated by the propeller and that in the opposite rotational direction by the rest of the airplane. When the aircraft is sitting stationary on the ground, the torque can only be resisted by the main landing gear, and obviously the wider that is spread, the easier it is for the aircraft to resist the turning moment. This torque does not vary substantially with aircraft speed; it is primarily a function of engine power setting.

The next phenomenon is the rotational effect of the slipstream on the surfaces of the airplane. The predominant effect relates to the fuselage and the vertical surfaces. Slipstream effects on the wing and tail surfaces tend to be opposite to torque effects. However, the effect of slipstream on the vertical tail depends on the latter's vertical position. If it is above the thrust line of the engine, then a side force is generated which will turn the aircraft to the left, and if it is below the thrust line, then it will try to turn the aircraft to the right. The latter is helpful, the former is not. Remember that yawing to the left induces rolling to the left, which is in the same direction as the torque forces. We don't usually put the fin below the thrust line because that makes it difficult to rotate the airplane at take-off, so the top mounted fin is usually bad news. Those of you who have built free flight power competition aircraft know that we often mount the wing very close to the engine on a high pylon. This pylon gives a side force pretty much on the c.g. of the airplane, so doesn't induce much yaw, but it does produce a fairly healthy side force (being very close to the propeller) which results in a strong rolling moment opposed to the moment induced by the engine torque. Careful selection of pylon area allows us to trim the airplane to climb in a spiral either with or against the torque.

The third phenomenon is a bit more esoteric, and relates to tail draggers versus tricycle geared aircraft. It also, however, relates to either type of aircraft as it rotates to get lift as it takes off. This probably needs a picture, so I hope I can sketch something that's intelligible.



This supposedly shows an engine thrust line moving at an angle to the flight path. As shown, this would be typical of a taildragger running along the ground, but note that it also applies to an aircraft flying at a high angle of attack, which generally means slowly, or to an airplane which is rotating as it takes off. The nearer blade to us is going upward if we are looking at the left side of the aircraft and the further blade is going downward. If the airplane's flight path and thrust line are at say 10 degrees to each other, then the nearer blade will be at 20 degrees less incidence than the further blade and so will generate a lot less thrust. The net thrust from the propeller will thus appear to come from a point which might be an inch or so to the right of the actual thrust line. The steeper the angle between the thrust line and the flight direction, the greater will be the effect. Let's see how this translates to a typical World War I fighter. Engines rotated relatively slowly and so propellers were large, which meant long landing gears and steep thrust line angles. No surprise that these airplanes were notoriously bad ground handlers.

Let's follow one of these aircraft through takeoff. First, we're standing at the end of the runway. There's no forward speed so air gets pulled through the propeller parallel to the thrust line. No effect of thrust line angle yet or for a little while until forward speed builds up. The torque on the airplane is just a function of engine rpm and there is almost no resistance from the flying surfaces (wings, tail, fin) as yet. The main reaction is from the landing gear. The side forces from the slipstream are again proportional to engine thrust and have very little to do with forward speed. So at the beginning of

takeoff, slipstream side forces and landing gear torque reaction dominate.

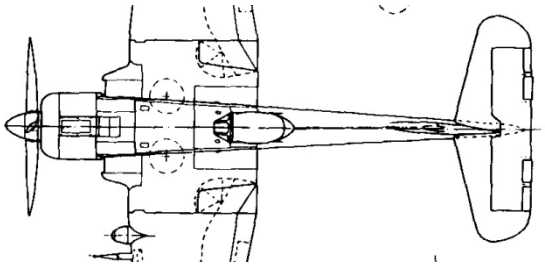
As we accelerate, the effect of the thrust line angle starts to take over and the airplane begins to see more offset thrust, which means more left turning moment. At this point there still isn't very much aerodynamic force available from the flying surfaces as we are below stall speed.

Finally, we get the tail off the ground and the thrust line is now parallel to the direction of flight. The inclined thrust line effect goes away and the only forces tending to turn the airplane left are torque and slipstream. By this time however we've got quite a bit more aerodynamic forces from the flying surfaces (remember force is proportional to speed squared) to counteract these two effects. We've got it made - right?

Almost! We finally have to apply up elevator to get enough lift to get off the ground - remember our World War I heroes didn't have the benefit of the huge thrust/weight ratios that we have today in the model world - and suddenly we're back into the large offset thrust moment, probably at full power, caused by the misalignment of the thrust line and the flight direction. However, that doesn't last long as the airplane quickly starts to pull up at a fairly moderate angle of attack as its speed builds up. Now there's another however! If we start to rotate at too low a speed and the aircraft is near or past the stall angle, it can hang in this position, not get off the ground, and veer to the left. Sounds familiar? The immediate solution (theoretically!) is to either put in down elevator, reduce incidence and increase speed before rotation, or cut power and start again while applying massive right rudder. My solution is generally (1) panic, (2) apply lots of power, (3) stall airplane while pivoting on left wing tip, (4) re-kit airplane.

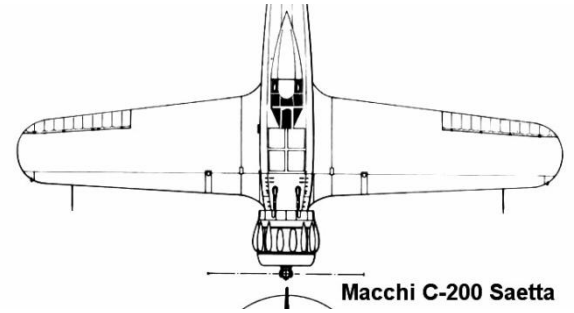
Tail dragging pattern aircraft generally don't have these problems for two major reasons. First, their attitude to the ground is much flatter - propellers are relatively small and landing gears are short - and their thrust/weight ratios are high, so they generally fly right off the ground without much rotation.

Several trim techniques have been used to offset these effects, the most common being right side thrust. This is particularly common on World War I type models, which tend to sit fairly high with a steep thrust line inclination. Even World War II airplanes needed something of the sort, as they got substantially higher thrust/weight ratios, but still had the tail dragger configuration. The Blackburn Firebrand went from prototype to production via doubling the vertical fin area and installing it with substantial side angular trim.



Note, however, that if you want to build an accurate scale model of this airplane, then you must have a propeller which turns in the opposite direction to American full-size and model engines and motors.

The Macchi MC.200, probably the best Italian WW II fighter, had the left wing a little bit longer span than the right wing, and several aircraft have had increased incidence on the normally down going wing. The wing asymmetries are less effective than side thrust, because they rely on the airplane getting up to sufficient speed to make the flying surfaces effective. The offset fin is somewhere between the two, because it does counter the effect of propwash to some extent.



Note also that inputting lots of downthrust negates to some extent the difference between thrust line alignment and flight path at high angles of attack. It is very common to see both downthrust and sidethrust recommended to aid in counteracting the left turn tendencies at take-off. However, one should be careful with downthrust. Its primary purpose should be to maintain unchanged trim with

power setting. So set the downthrust to achieve this desirable feature, and then add sidethrust as necessary.

The disadvantage of any of these techniques is that they are still present at higher speeds, when they are much less necessary, and they tend to work in the wrong direction when the aircraft is inverted. However, if you were a Sopwith Camel pilot, you would probably trade these inconveniences for being able to get off the ground at all!

That’s probably more than enough on that subject, so until next time, just enjoy your flying!