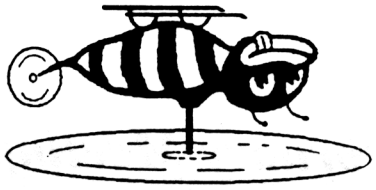
# BEES BREEZE



***RC BEES of Santa Cruz County, Inc.***

AMA Chapter 144

Newsletter January 2010

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## Next Meeting

**Thursday, January 21st, 2010.**
**At the EAA building, Aviation Way, Watsonville Airport, 7:30 PM.**

### Treasurer's Report – December/2009 totals

| | | |
|---|---|---|
| **Beginning Balance** | **$5995.45** | **$6024.31** |
| **Income** | | |
| Apparel sales | | $241.00 |
| Donations | | $436.00 |
| Dues | $866.00 | $2784.50 |
| Fuel Sale | $309.00 | $1526.00 |
| Total Income | $1175.00 | $4987.50 |
| **Expenses** | | |
| AMA Charter fee | | $270.00 |
| Apparel set-up and purchase | | $159.89 |
| Gift and donations | $109.25 | $109.25 |
| D&G Sanitation | $ 65.40 | $782.40 |
| Field expenses – misc. | | $281.87 |
| Field expenses – mowing | | $150.00 |
| Fuel purchase | | $1861.20 |
| Office expense – misc. | $41.67 | $58.67 |
| Office expense – newsletter | | - |
| Fun Fly expenses | | $384.40 |
| Total Expenses | $216.32 | $4057.68 |
| **Ending Balance** | **$6954.13** | **$6954.13** |

**Notes:**

Year ended with more money in bank than at start.

Donations aided treasury.

Fuel sales lagged – have inventory, especially helicopter fuel.

Bill for field camera not included, about $500.

Editor has not submitted 2009 newsletter expense.

### December Meeting Minutes

Prior to the meeting on December 17th, Allen Ginzburg and Jacob entertained the early birds with a demonstration of miniature helicopter flying with a pair of Blade MCX's, Allen's being the later S300model. It is truly amazing how so much avionics is packed into such small spaces so cheaply.

President Bill Moore called the meeting to order at 7:34 p.m, when seventeen members were present. Minutes of the previous meeting and published treasurer's report were approved.

### Old Business

The remote sensing camera is working fine, but it appears that the solar panels are not adequate at present. Rotation capability has still to be added. *(This has now been taken care of by considerable volunteer time and effort by Allen Ginzburg and John Williams. Thank you both very much!).* The Pajaro Dunes access point is be further investigated to see if the connection can be improved.

Allen Ginzburg has now added both newsletters and Aero 101 articles to the web site.

Club hats are available for $10 each, and we have lots of fuel, particularly for helicopters.

**New Business**

It was suggested that we link club events to local overall model airplane coverage. This can be put on the web site.

As the treasurer's report shows that we are close to running even for the year financially, there seems to be no reason to change the annual dues, which stand at $48 per annum for adults. *(The treasurer's report shown in this newsletter takes us to the end of the year, and essentially confirms the conclusion at the last meeting. However, please note our treasurer's comments).*

Don Good proposed extending the runway for longer landings. Bill Moore thought that a ballpark figure if $4000 would probably be required to do this work, and further discussion related to improvement that could be made by flattening the existing grass area at the west end of the runway.

Despite efforts to get new blood into the various club offices, the combination of mailed in votes plus those from members present at the meeting was sufficient to give a quorum with a unanimous vote for the existing officers to continue in office.

Alan Brown suggested that in addition to the free lifetime membership given to John Nohrden on the occasion of his 90th birthday, a similar membership should be given to Mel Avery in recognition of his being very close to that age, and also having made major donations of models and materials to the club. This was carried unanimously.

Once again, we thank Marlene Boracca and Marlene Williams for cookies, and Bill Boone proposed, Allen Ginzburg seconded, and all agreed that we should send floral arrangements to them both before Christmas. *(This was done, and both ladies sent nice replies which have been pinned up on the storage facility door).*

**Show and Tell**

Bob McReynolds followed up on his Sukhoi 34 'Fullback' with an Aerosmith F-117. It has retracts and bomb bay doors. With a 3-cell 2200 mAh and all servos fitted, it sells for $229, a very good price.

Benno showed us simple simulators on his Ipod; an RC airplane simulator costs $1, as does one for a helicopter!

He also showed a miniature P-51, similar to the one that Allen Ginzburg has been flying recently. Not to be outdone, Allen demonstrated the use of grappling hooks from Boomtown Hobbies on his Blade MCX helicopter, picking up several small items from the president's desk! The 110 mAh LiPo battery used to power this aircraft costs $2 from Hobby City! Allen also showed us a modification he has made to his charger which allows him to charge three small LiPo batteries at the same time, using mini JFC connectors.

Ex-member Jeremy MacDonald has kindly donated all his remaining modeling equipment in various states of repair to the club. It included a flight box, starter motor, old original Great Planes simulator, and two gliders, one requiring some repair, and the other in partial kit form, and some balsa sheets. These were all snapped up by eager scavengers, for which we thank Jeremy very much. Some of the material, including the simulator, will go to the club in general for use in training new members.

Jacob showed us a partially completed aerobatic model made from ¼" foam sheet with a small top wing above the main wing. He is certainly to be applauded for his innovative designs.

The meeting was adjourned at 9:04 p.m.

**Announcement from our treasurer**

1. In order to renew membership in the Bees for 2010, I need a signed and dated RC Bees application, dues, and an AMA membership verification for 2010 submitted together. If I am missing any one of the items, I cannot process the application for renewal, and will return the incomplete application.

2. The combination to the locks at the field will be changed on February 1, 2010.

Dennis Kanemura

**Down by the River**

What's been flying recently?

Mike Evans has been flying an old P-51 and a brand new Great Planes Siren powered glider. John Williams flew his T-34 and his very scale-looking Stearman biplane. Bill Moore made a relatively rare appearance adding to the number of T-28's flying around.

Steve Jones put on his usually fine pattern demonstration with his electric Brio, while Dennis

Kanemura was not to be outdone flying his Mountain Models Tantrum. This appears to have the identical fuselage to their Flashback as flown currently by Allen Ginzburg, but has thicker constant-chord wings.

Jim Heffner regularly brings out his WW II fighters, most recently a P-40 and P-51, and Don Good is now campaigning Ross Dewees' Seagull Edge 540 powered with an OS 91.

However, Jacob takes the prize for innovation this month with his T-28 converted for inverted landings and his profile foam Pogo, modeled after the Great Planes ARF. Here they both are:


Check out the tail-dragging landing gear on top of the T-28.

Here's the Pogo ready for take-off, and at the top of the next column in vertical mode and in full transitioned flight. This is a very fine achievement in design, manufacture and test flying. Something that any airplane company would be proud of!

In the pretty airplane department, John Williams cleverly managed to have Marlene buy him a Hangar Nine Toledo Special for Christmas, and here it is seen on the ground and in the air, courtesy of Don Good's fine photographic talents.

Another of John's airplanes seen next, his Miss America Reno Racer.

The photographer seldom seems to get his airplanes in the newsletter, but this time we have an exception with Don Good's T-34. Unfortunately, Don hasn't learned how to fly his airplane and take pictures of it at the same time, so no flying shots as yet!


We've got into the habit of taking river shots recently, with so much more interest in waterborne flying, so here's Nick Tannaci's airplane after being rescued from Monterey County's trees, together with Jacob's SeaWind.

**<u>Aero 101</u>** – How wings really work!

Sorry, folks, it can't all be pretty pictures, but I've got to fill some space, and we've had more articles in the magazines on how wings work, generally with a few inaccuracies, so I'll try to summarize how we really get lift out of our wings.

The most recent article covering this subject is closer to the mark than most (Dean Pappas, "If it flies", Model Aviation, December, 2008) but still has some major inaccuracies in it. I'll get to those in detail later in this article.

An article on "The lift from an aircraft's wing" by Dr. Gregory Romine that appeared in the March 2002 issue of Model Aviation contains some errors. In the May, 2005, issue, we have a repeat of the same erroneous comments by a very fine aeromodeler and writer, Frank Granelli. Frank comments as follows: "But how does an aircraft with a fully symmetrical wing fly? Daniel Bernoulli is on vacation where this wing is concerned, but fortunately for all sport and Aerobatics pilots is concerned, Sir Isaac Newton remains in the house. - - - - There is still much debate about this subject even after 102 years."

The main purpose of this note is to clarify some aspects of the application of Bernoulli's equation and to lay to rest some common misconceptions about how how airfoils work. It should also be noted that among aerodynamicists there is no debate. The debate has only been engendered recently by some totally invalid assumptions and superficial articles.

Let's define Bernoulli's equation. $H = p + \frac{1}{2} \rho V^2$ where H is the total head or total pressure, p is the static or actual pressure that would be measured on a surface, $\rho$ is the air density, and V is the velocity of the air moving past the body, in this case the wing. What Bernoulli is saying is that there is only a certain total amount of effective pressure available, and if the flow speeds up, the pressure must go down.

Dr. Romine starts out with a statement regarding "What provides the lift that keeps it (an airplane) in the air?" inferring that there is a controversy between adherents of Bernoulli's equation and those who say that the air deflected downward by an airplane wing provides the lift. Unfortunately, this so-called controversy has been generated over the past ten years by some erroneous books and articles on the subject. Two that come to mind are Jef Raskin's article "Understanding how models really fly" in the January, 1996, issue of Model Airplane News, and a recent book "Understanding flight" by Dr. David Anderson. In both cases there are some fundamental errors which contribute to the apparent controversy.

In reality, the lift generated over a wing can be computed or measured in several different ways. One is to determine the pressures over the wing surface, and then integrate them to determine the overall lifting force generated. If the flow is

unseparated, and the boundary layer in which viscous forces are dominant is thin compared to other flow field dimensions, and the Mach Number is low enough that the flow can be considered incompressible, then Bernoulli's equation can be used as an aid in calculating the pressures. This is true for any angle of attack which satisfies the criteria above, and is not limited to zero angle of attack. If these criteria are not met, we have to go to more complicated equations, as is currently done in modern computational fluid dynamics (CFD).

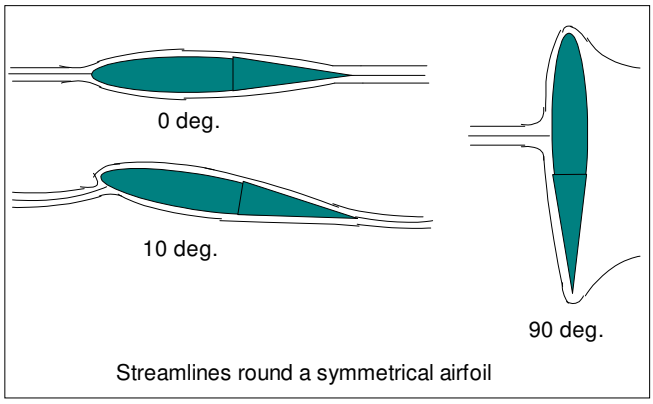
A second method used in wind tunnels is simply to measure the overall forces on the wing directly, and a third method could be to measure the net forces on the deflected air, taking advantage, as correctly noted by Dr. Romine, of Newton's third law of motion. The latter measurement is not easy to make, and in fact we generally use one of the first two approaches.

The point to make is that these different ways of determining the lift on the wing are not contradictory. They all will give the same answer. Clearly the net force on the wing must be equivalent to the sum of the pressures on the wing.

Well, so far so good. You may well ask "What's the problem?" The problem in Dr. Romine's article is implied in the figure which shows a picture of an airfoil with flow going on either side of it together with equations showing the difference between upper and lower pressures. This is fine but doesn't tell the whole story. There is an implication that there is one velocity over the upper surface and another lower velocity over the lower surface, and that the flow divides at the wing leading edge. It is interesting to note that in the book "Understanding Flight", Dr. Anderson makes the same assumption, and uses it to prove, using a Cessna 172 as an example, that the difference in pressure is insufficient to sustain flight. Therefore, according to Dr. Anderson, the whole science of aerodynamics is incorrect. The reality is of course that Dr. Anderson started off with an incorrect assumption.

In fact the velocities over the two surfaces vary continuously from front to back, starting at zero at the so-called stagnation point, near but not necessarily right at the leading edge, and accelerating, more rapidly on the upper surface, in roughly the first quarter-chord length, before moving back toward the freestream value as the stream tubes get toward the trailing edge. The pressure and velocity vary along the stream tubes consistently with Bernoulli's equation if the criteria of the previous paragraph are met.

To use Bernoulli's equation successfully for an airfoil at an angle of attack, one has to involve other functions to determine stream tube patterns, but along any particular stream tube, Bernoulli's equation applies. In particular, the location of the stagnation point on the airfoil involves these other functions.



Streamlines round a symmetrical airfoil

It is incorrect to assume that the flow divides right at the most forward point on the leading edge. This would be true for a symmetric airfoil at zero angle of incidence, but as the angle is increased the dividing point moves under the airfoil, and air actually has to move forward around the nose of the airfoil generating very high local velocities as the local radius of curvature reduces. This will seem fairly obvious when one considers the case of 90 degrees incidence. Clearly the dividing point is going to be about half way between the leading and trailing edges. From this discussion we can readily see how a symmetric airfoil generates lift, and why an airplane with a non-symmetrical airfoil can fly upside down.

An interesting side issue is that a typical stall warning device on a general aviation aircraft consists of a floating tab sticking out on the lower surface of the wing near the leading edge. At low angles of attack the tab is pushed backwards by the airflow, but as the stagnation point moves aft over the tab, the flow over the tab now moves forward, deflecting the tab into a forward position, and closing an electrical circuit which alerts the pilot.

(To be continued).

**Note:** Please look at Allen Ginzburg's panorama attached separately showing a combination picture taken from our field camera.