



KNOX COUNTY RADIO CONTROL

April 2019 Newsletter

Knoxville TN AMA #594

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KCRC EXECUTIVE COMMITTEE MEETING MINUTES February 25, 2019

The KCRC Executive Committee met at 6 p.m. Monday February 25, 2019 at Cheddars Restaurant on Kingston Pike in Knoxville. Ed Dumas, Paul Funk, Michael Catlin, Randy Philipps, John Baselone, and Roger Kroodsma were present. President Ed Dumas presented updates and brought up a number of topics for discussion.

The Senior Pattern Association contest is at the KCRC field May 17 and 18.

The Cub Fest will be June 1 and handled by Ed Dumas, with a rain date of June 2.

The Marine Mud Run will be Saturday September 28.

The next meeting will be March 19 at New Beginnings Baptist Church as noted in an email March 6 from Michael Catlin.)

2019 Elected Officers

Pres.....Ed Dumas.....ed@eddumas.com

Vpres.....Paul Funk.....paulfunk24@gmail.com

Secretary.....Roger Kroodsma.....rogkroods@att.net

TreasurerMike Catlin.....catlimi2000@yahoo.com

Executive Board

Randy Philipps.....randy@accessolutionsinc.com

John Baselone.....jrbfarm@yahoo.com

Safety Officer

Denny Evans (Pending).....evans9633@bellsouth.net

The tour scheduled for March 12 at Cirrus Aircraft will be rescheduled do to a scheduling conflict and several Executive Committee members being out of town.

Possible times for KCRC Fun Fly events were discussed—one to possibly be held in April and another one in September, with Paul Funk and/or Randy Philipps coordinating.

Another indoor flying event at the K9 Center is being planned for possibly sometime in March or April. The last one held several weeks ago was quite popular, and there have been requests for another one. The club made a profit of \$25 from the last one. Michael Catlin, who coordinated the first one, has volunteered to also handle this one.

Discussion followed of having a float-fly on Melton Hill Lake near the KCRC field or at the Oak Ridge Rowing Area, sometime in May, June, or the fall, with the date of the Mud Run being the favored time. Paul Funk is experienced with radio control events on the Lake, with the controlling authority being the TVA, and will do some checking.

The Boy Scout Scoutfest will be held about the 3rd week of October at The Landing At River's Edge in Blaine east of Knoxville . Potential participation by KCRC members was discussed.

Joe Nall Week is May 10-18 at the Triple Tree Aerodrome.

The budget for this year will be discussed at the next club meeting. Currently, there is uncertainty about the budget because 30 members have not yet paid their dues for the year.

Treasurer Michael Catlin will post a list of paid members...he has already sent an email to non-paid members. There was discussion of not allowing non-paid members to fly after a certain date, which is apparently not specified in the bylaws. Also discussed was the possibility of raising dues but providing a discount for people paying by Dec. 31.

Needed field improvements may include painting of the Pavilion and replacement of some rotten boards. John Basalone will check.

The combination on the gate lock will be changed soon. Usually this is done by Phil Cope in early March.

The remainder of these minutes is related to the possibility of installing an RC vehicle track at the KCRC field, which was discussed at length.

Randy Philipps has explored the possibility of installing a track and presented some information he obtained. He distributed a memo from Julio Hernandez, who is the Chief Operating Officer of ROCCK (Radio Operated Car Club of Knoxville). The memo provides a summary of the concept of a KCRC practice track including a supplies list and suggestions for communication with Gary Phillips of HobbyTown Turkey Creek, KCRC starter packs, volunteers from ROCCK, number of core families needed, getting help from the Knox County Recreation Department, track construction and maintenance, and recommended RC vehicles. Randy also distributed diagrams of possible track patterns.

A drone course and an RC vehicle track are needed to maximize radio control participation at the KCRC field, increase membership, and justify the club's continued presence on the field.

Compared to a racing or competition vehicle track, a practice or recreational track of grass for the general RC community and most popular RC vehicles is better for increasing participation and use of the KCRC field.

The vehicle track needs a fairly level area and should be west of the driveway, where erosion control will also be easier. The gradually sloping area east of the driveway is well suited for a drone flying course.

Rather than having the current racing course for drones, the club should perhaps have a drone course attractive to a wider group of potential users. The level of interest in the club in having a drone course as well as a vehicle track will be explored and discussed at the next meeting. Currently, there is not enough use being made of the existing drone racing area.

Gary Phillips at HobbyTown would help in spreading the work about a car track, and RC vehicle sales there could indicate potential participation at KCRC. KCRC could provide written material promoting its vehicle track to be included with each RC vehicle sold.

The size of the track and track patterns were considered. John Basalone will mark out a proposed location for the track. The layout will permit mowing inside the track, and a removable section will be provided to allow mower access to the inside.

An elevated platform will be needed for vehicle drivers, and its location and person capacity will be determined.

Some jumps will be needed. These could be wooden jumps that could be easily moved or jumps made of dirt provided with a permanent cover for erosion control. Fill dirt will be needed for dirt ramps.

Cost of pipe and spikes for laying out the course of the track was discussed and might total around \$500.

There was discussion of the adequacy of the club's finances to develop a vehicle track and the amount that could be spent, perhaps around \$3000. We need to do a good job on the track to maximize participation and for approval of Knox County.

Melton Hill Park adjacent to KCRC is underused and could possibly benefit from increased activity at KCRC. The Knox County Recreation Department might help with any necessary excavation.

The amount of dues for vehicle drivers who do not fly RC aircraft was discussed.

A vehicle track will reduce the amount of the hay crop for the person who mows the fields.

It was recognized that mowing would be the largest of the club's expenses without John Basalone's volunteer work.

Planning, approvals, and construction need to progress rapidly so a vehicle track is available for spring and summer months. A plan needs to be prepared, including costs, and shared with Knox County. Other counties have RC vehicle tracks (e.g. the Indy track at Indianapolis), and information from these counties may be helpful in our planning and for sharing with Knox County. Paul Funk will attempt to get the power-point talk that was presented to the county for the Indy track.

The meeting ended at 8:30 p.m.

Respectfully submitted, Roger Kroodsma, KCRC Secretary....--Roger

Around the field



Steve Bayless was able to modify a pilot figure I gave him to fit his airplane and to have a more "pilot like" pose. The hat was removed and the right arm was cut loose and rotated into a more natural position. Steve did a good paint job too.

Article for April

This month I would like to do a much simplified analysis of a turbine (fan). And, while doing so introduce a piece of software I use for calculations.

Ever tried to add 100 square to 10 inches? What did you get? And, is the answer realistic? Probably most people just plug numbers into an equation assuming the answer will be correct. But what if some of the numbers represent metric values and some imperial? Well, most people will recognize that some conversion is needed. What if I told you that there is a program out there that will do the conversion for you and not allow 'mismatched' calculations.

```
Length=10in
```

```
Result=Area+Length
```

```
Result=|||
Units don't match.
```

The program I am talking about is SMath (<https://en.SMath.com/view/SMathStudio/summary>). SMath is a tiny, powerful, free mathematical program with WYSIWYG editor and complete units of measurements support. Constants and variables are defined in their 'native' units and calculations proceed by automatically making the conversions. Results can be displayed in any system the user feels comfortable with. SMath is available for Windows or Linux and is a **FREE** download.

Let's start with with a turbine example. We will compute the thrust available for a turbine (EDF?) in free air traveling at 50 mph. The turbine is 90mm in diameter and the input power is 3000 watts. Realize this will be a gross simplification as we will not be defining number of blades, blade shape, frictional losses, inlet ducting or exhaust ducting.

```
InletDiameter:=90mm
```

```
InletDiameter=3.5433in
```

If you look closely at the equals sign in the upper line it is preceded by a colon. This indicates that the value was determined when the line was input. The units "mm" are in blue indicating that they are valid. In the second line the equals sign is simply an equals sign indicating that the value was 'calculated' and in this case the units were changed to "in" and the value reflects the conversion.

```
Inletradius= $\frac{\text{InletDiameter}}{2}$ 
```

```
Inletarea= $\pi \cdot \text{Inletradius}^2$ 
```

```
Inletarea=6361.7251mm2
```

The next 3 lines show the calculation of the inlet area. First we need the inlet radius so we divide by 2 and unlike Excel or Calc the equation looks like something understandable unlike the strung together math used to condense it to one line. The second line shows the equation used to calculate the area. The Pi symbol can be typed by pressing control +G and then typing p or the Greek character can be selected from a menu. In case you are wondering subscripts can be achieved by placing a period "." in the variable name before the subscript. And exponents can be entered by typing "^".

```
Inlet_area = 6361.7251mm2
Inlet_area = 9.8607in2
```

Like in the first pair of lines the displayed units can be changed by the user to be more 'readable'.

```
Velocity = 50mph
+
rho = 0.0023769  $\frac{\text{slug}}{\text{ft}^3}$ 
Massflow = Inlet_area * Velocity * rho
Massflow = 0.1742  $\frac{\text{kg}}{\text{s}}$ 
```

The speed is 50 mph in the Imperial system. The density is in the Imperial system and has the units of slugs. (Go ahead, look it up.) Mass flow is density times the area times the height over time. And since slugs per second doesn't mean much to most people I left it as is.

```
Inlet_energy = Massflow * Velocity2
Inlet_energy = 87.0285W
```

The equation for energy is mass times velocity squared as shown in the first line. Don't worry about the mass flow not being purely mass because changing the units nets "W" or watts. So the air entering the turbine is the equivalent of 87 watts.

```
Motor_energy = 3000watt
```

Three thousand watts is the rating on the motor and in our 'perfect' world there are no motor losses, no turbine losses and all the energy gets dumped into the mass of air going through the turbine.

```
Turbine_energy = Inlet_energy + Motor_energy
Turbine_energy = 3087.0285W
```

The energy coming into the turbine doesn't disappear but instead gets added to the turbine energy.

$$\text{Turbine}_{\text{velocity}} = \sqrt{\frac{\text{Turbine}_{\text{energy}}}{\text{Mass}_{\text{flow}}}}$$

$$\text{Turbine}_{\text{velocity}} = 297.7896 \text{ mph}$$

Doing a little algebra extracts the turbine velocity and uncovers the speed at which the air leaves the turbine. And since $F=M \cdot A$, thrust is equal to the mass flow (per second) times velocity (also per second) giving per second squared (acceleration).

$$\text{Thrust} = 4.3378 \text{ lbf}$$

For our imaginary world the thrust is 4.3378 lbf. Why lbf? Because pounds are in terms of an Imperial mass (slugs) in a gravity field so the proper term is lbf. Don't worry, it is still pounds to you and me.

I hope this has demonstrated the utility of this free program and its handling of units in different systems.

Remember if the units don't work out properly then the equation is incorrect.

While doing some design work on a homebuilt for a friend I tried using some equations out of a popular homebuilt aircraft design book. When I started entering the equations and values I started coming out with strange units. Turns out there were several missing parameters needed to get the units correct.

When I notified the author he was very condescending and basically told me that write him again when I had the "needed" experience. I ran this by one of our stress engineers and he was aghast not only by the answer I received but by the author's refusal to even acknowledge that there might be a 'dangerous' mistake published.

Another time I assigned a junior engineer to design a hollow box beam and told him to use 0.063 6061 aluminum sheet and 2 x 2 x 0.063 6061 extruded angle. A while later he came back and said that he needed to use 0.125 aluminum sheet. I was a little surprised but I approved the change. He soon came back and told me he was trying 0.25 thick sheet aluminum. OK, now something is wrong.

We went over his numbers and everything looked correct and then I asked him where he got the formula he was using and he showed me the equation in the book. When I asked if he had done a 'units' analysis I was met with a blank stare. When we analyzed the equation's units we discovered that there was an incorrect exponent. In other words the book was wrong!

I hope that this has been informative and given you a fundamental distrust of published material.

