



Newsletter

Knoxville TN Dec. 2018 AMA #594

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KCRC Meeting Minutes 11/13/2018

OLD BUSINESS

The November 2018 KCRC meeting was held on the 13th at Fellowship Church, 8000 Middlebrook Pike, room 601. President Ed Dumas called the meeting to order at 7:00PM. There were 24 members in attendance.

The October regular meeting minutes were approved by unanimous voice vote.

Michael Catlin gave the Treasurer's report which was accepted by unanimous voice vote.

Field Officer John Basalone had no field issues to report at this time

Safety Officer Denny Evans suggested we might want to consider having the driveway scraped again soon.

Ed Dumas reported that the field search committee members Ed Dumas, Paul Funk and Randy Philipps will be meeting with the new Knox County Director of Parks and Recreation, Paul White, tomorrow (Nov 14th) at 10:00AM. The purpose is introduce KCRC to him, emphasize the service and benefit KCRC provides to the community and discuss the future of KCRC at its current site. A report on the meeting will be given at the regular December KCRC meeting.

Paul Funk volunteered to check with Kevin Turner and the new "Racing Drone" members and report next month. They removed their gates and haven't been seen at the field lately.

2018 Elected Officers

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

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

Secretary.....Rick Thompso.....jrt1953@gmail.com

Tresurer (acting)..Mike Catlin.....catlimi2000@yahoo.com

Executive Board

Randy Philipps.....randy@accesssolutionsinc.com

John Basalone.....jrbfarm@yahoo.com

Rick Thompson.....jrt1953@gamil.com

Safety Officer

Denny Evans.....evans9633@bellsouth.net

The Horizon Hobby "dealer days" event which was held on October 10th and 11th went well in spite of marginal weather. Representatives from about 6 hobby shops attended on the first day. Horizon donated 2 planes to KCRC in appreciation for use of our field. Randy Philipps and others suggested we might consider raffling them off for the benefit of the club, perhaps at the 2019 CubFest event.

Dealer Days event photos courtesy of Scott Anderson.





At last month's October meeting, a motion carried to allocate \$120 for an indoor fly-in at the K9 center off Lovell Rd. A motion was made and carried at tonight's meeting that a tentative date of December 14th be set for the fly-in. The club's cost will be partially offset by charging a \$5 landing fee.

Late correction, the indoor flying event originally scheduled for December 14 has to be moved due to scheduling conflicts with the venue? Potential new dates will be discussed at the next club meeting. Time to start getting your indoor flier ready!

NEW BUSINESS

The nominating committee presented the following members for club offices in 2019:

President: Ed Dumas

Vice President: Paul Funk

Secretary: John Partridge, Roger Kroodsma

Treasurer: Michael Catlin, Joel Hebert

Board of Directors: Rick Thompson, Randy Philipps, John Basalone

It was discussed as to whether or not the by-laws would allow the installation of officers and a budget to presented during the same club meeting. It appears that it would be allowed – there is no such prohibition in the by-laws.

A motion was made to use the Golden Oak in Oak Ridge as the site of the January KCRC banquet. The motion carried by unanimous voice vote.

We are set for the Golden Oak Grill & Cafe @ 7:00pm on January 8, 2019 -- second Tuesday of next year!!

Ed announced that the Executive Committee, at its last meeting will require that members with handicap stickers who choose to exercise their privilege of driving their vehicle up to the flight line shelter while loading or unloading, will be required to provide a current copy of their handicap sticker to the club treasurer. For members in this category, please furnish a copy to Michael Catlin at your earliest convenience.

Denny Evans reported that the Church Youth Group Fun Day, held on September 29th, was a raging success. Denny said there is a lot of interest in having another such day in the spring.

Jimmy Russell proposed May 18th and 19th for the 2019 SPA contest. This was approved by unanimous voice vote. Jimmy will be the CD for this event. A big thank you goes out to Phil Spelt for his service as CD of this event for many past years. Phil has chosen to step down this year.

There was no Model of the Month entry.

There was no Crash of the Month entry.

Thanks goes to Michael Catlin and Steve Jones for program presentations after the meeting. Michael gave a demonstration on 3D printing and Steve showed video of a recently attended airshow.

Respectfully Submitted,
Rick Thompson, Secretary

The 3D printing presentation included a 'live' print being executed on a printer while the meeting was in progress. The demonstration showed a typical design being created using 3D graphics software and "slicing" the design using Cura slicing software which transforms the model into G-code which the printer uses to trace out each layer. The G-code file was then transmitted to the Octopi printer controller via WiFi. Several free graphics programs were suggested to allow members to start designing on their own.

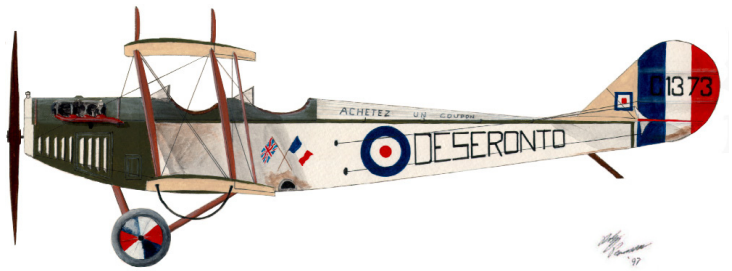


This month's article is on aircraft lofting.

Conic Lofting

Q: I keep trying to design my own aircraft but now matter what I do it looks like a box with round corners. How do aircraft get such smooth shapes?

A: Aircraft are designed with the aerodynamics in mind. They tend to look like airfoils so that is the shape to be emulated but they also need to carry people or cargo so the shape is modified to accommodate a pilot looking out and to accommodate the frontal area of the engine. Early aircraft were shaped by their structure. Square and boxy aft of the wing due to the truss space frame being covered by fabric. Round in front if equipped with a radial or rotary engine or boxy in front when fitted with a water cooled inline engine. Having a radiator up front also contributed to the look.



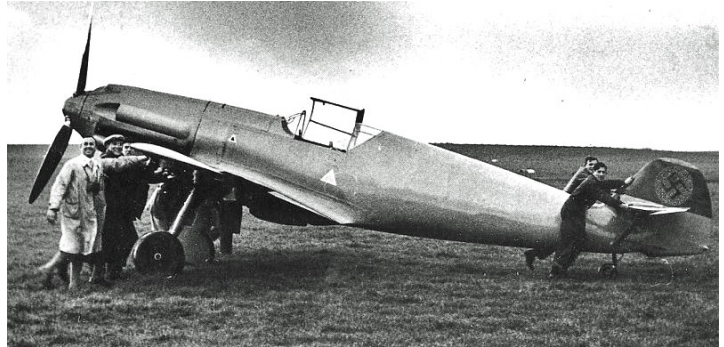
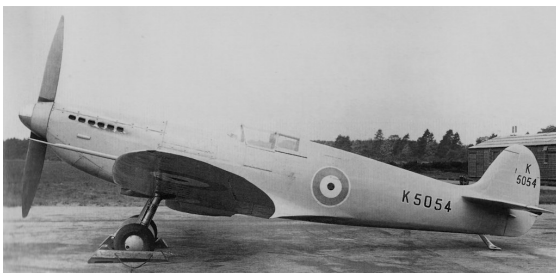
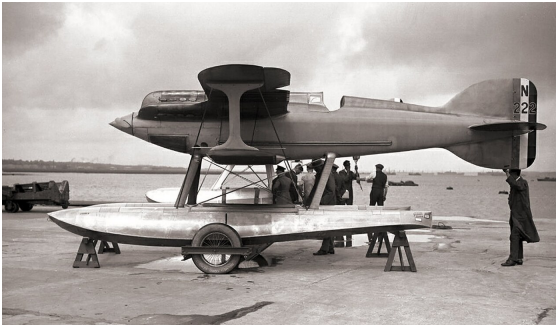
As aircraft speeds increased designers looked to other methods of achieving an aerodynamic shape. Boxy frames were fitted with frames holding stringers to 'round out' the boxy structure when fabric covered. When metal skins were added they tended to have flat sides with radiused corners. Easy to form and looking carefully at General Aviation aircraft one can see this used in an effort to reduce costs.





Q: So I am stuck with boxy aircraft models?

A: Not at all. Once aircraft speeds began to increase designers had to reduce drag. In the late 1920's and early 1930's bombers flew faster than the fastest fighters which meant that designers had to get rid of biplanes, fixed landing gear and open cockpits. The Schneider Cup races showed Mitchell how to get high speeds out of aircraft resulting in the Spitfire and Messerschmitt learned from designing gliders and civilian aircraft to develop the Bf109. Sydney Camm rose through the ranks at Hawker Aircraft and was responsible for the design of the Hawker Hurricane. All very sleek and fast aircraft and not boxy.

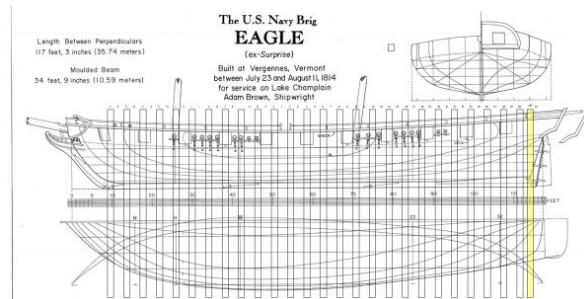


Q: So how did they develop their shape?

A: They relied on time proven methods of ship lofting.

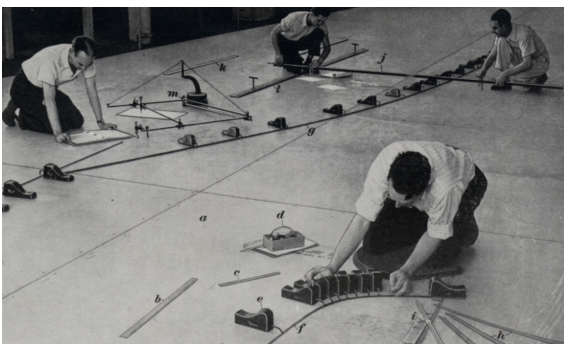
Q: Ship lofting? How would that apply to aircraft.

A: Ships require a smooth hull to allow them to slip through the water easily and most ships consist of periodic frames and the shapes of these frames need to be accurate else the builders would spend most of their time reshaping frames to fit. Three views of the ship were required, a waterline view, a section view and a buttline view. By drawing smooth curves at different waterline heights and transferring the widths at various station cuts the shape of the ship is created. As a check, the heights on the stations are transferred to a buttline view which showed how the smooth the lofting was. If there was a wave in one of the buttline curves the waterline view and station views were revised to smooth out the wave in the buttline view. Considerable time was spent 'fixing' the lines until a table of offsets could be given to the builders to construct frames. Once erected the frames were planed to allow the planking to sit flat as they curved around the hull. As a side note the ship lines developed were for the inside of the hull and when the planking changed thickness the ends were either planed to minimize the offset or ignored. In aircraft the lines are for the outside and changes in skin thickness are accommodated by offsetting the frames.





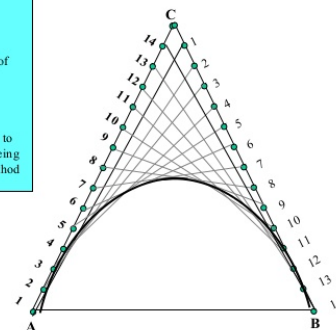
In aircraft, the plan view included the upper surface on one side of the centerline and the lower surface on the other side of the centerline. In a station view the view looking aft was shown on one side of the centerline and a view looking forward on the other. The buttline view is usually called the inboard profile and includes the placement of the engine, cockpit and other major items. Once the aircraft lines were completed full size frames were developed at closely spaced intervals, templates made from those frames and a plaster mold was made. Hence the term “mold lines” to denote the outer shape of the aircraft. The plaster mold was the last chance to make changes and an experienced mold maker could shave frames or add additional plaster to achieve a smooth and flowing surface. Checking of the mold’s surface was done by hand (quite literally). By lightly rubbing the surface the mold maker’s hand could detect slight undulations which were fixed by adding or removing material.



Problem no.8: Draw an isosceles triangle of 100 mm long base and 110 mm long altitude. Inscribe a parabola in it by method of tangents.

Solution Steps:

1. Construct triangle as per the given dimensions.
2. Divide it's both sides in to same no. of equal parts.
3. Name the parts in ascending and descending manner, as shown.
4. Join 1-1, 2-2, 3-3 and so on.
5. Draw the curve as shown i.e tangent to all these lines. The above all lines being tangents to the curve, it is called method of tangents.



**PARABOLA
METHOD OF TANGENTS**

Q:That must have take a lot of time?

A:It did and don't forget that the lines were also used to make wind tunnel models and when disturbances in the flow were found the lines needed to be fixed creating additional delay.

Once the molds were approved they were copied and carefully stored. The copies were used to make all the tooling for frames, ribs, skins and reference tools when lumps and bumps were added as the design matured.

Q:So with all this effort, how was it that the P-51 was designed and flown in 100 days?

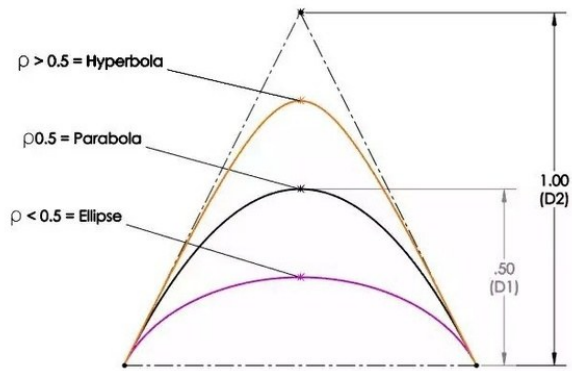
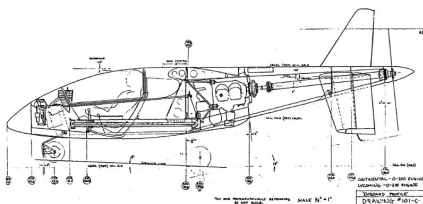
A:Short answer, it had already been designed using a new method that almost guaranteed a smooth surface. The surfaces were defined by conic curves. Instead of shipping heavy plaster molds across the Atlantic mathematical definitions of the aircraft's mold line could be transported by courier.

Q:Huh? What is a conic curve?

A:A conic curve is based on a second order mathematical equation which is inherently smooth and can be controlled to be tangent to a direction at each end requiring 4 controls (endpoint 1, tangent at endpoint1, endpoint 2 and tangent at endpoint 2) and a fifth control which lies between the endpoints along the curve. Once these 5 conditions are met the shape of the curve is defined. And, a conic curve cannot be wavy or fold back on itself. Using a bit of matrix algebra the conics can be defined in 3 dimensional space.

Q:Sounds WAY too hard...

A:Sounds hard but isn't as conics can easily be drawn and by using the conics in the 3 views of the aircraft the lines can easily be developed using pencil and paper or on a computer.



Q:If a conic curve cannot curve fold back how can a reflex curve be drawn?

A:To get a reflexed curve two conics are joined. One forms the convex part and the other forms the concave part. The 2 conics will share a common endpoint and tangency. Quite complex geometry can be pieced together if that is what is needed.

Q:So, How would I draw a fuselage?

A:Probably the best way to start is to draw the inboard profile which is the centerline of the fuselage. Place the needed equipment in place (motor, battery, engine, fuel tank, servos and receiver and anything else) and begin to construct the conics around them. At the nose for a conventional configuration I would set the start point of the forward upper conic at 1/2 the diameter of the spinner above the thrust line and set the tangency line to match the angle at the back of the spinner. At the uppermost point of the fuselage (about 30% of the fuselage length) set a horizontal tangency line and build the conic to clear any equipment by setting a defining a control point to clear the equipment. Or if needed pick a pleasing Rho value.

If there is more interest in this type of article I will continue with a series of steps that will outline the develop the loft data for a fuselage. Just let me know.