Newsletter

October 2019

What was that song which Dylan wrote? Something to do with the times are a-changing. The CAA have finally reached a decision on how to get us all to register as model flyers. For those who have gained their 'A' certificates, we only have to pay £9 for the privilege. Anyway, it could have been a darn sight worse and £9 is hardly a significant amount to pay. Members who have not yet got their BMFA A' certificate will have to undergo a test.

Anyway, the BMFA have offered to collect these fees from us when we renew our membership in December.

So, what's been happening this past month of inclement weather? I know for a fact that the field is a squelchy soggy waterlogged place and no wonder considering the amount of rain we've experienced.

Last Sunday I ventured to the field thinking that there would be loads of members getting the last few flights in before Winter starts producing some really cold days. There were a couple of models sitting out in the pits area but no members preparing to fly them.

I met everyone in a nice warm cabin - John Higgins told me that he had in fact already flown earlier. Then Jake and Jason turned up. Jake brought out his new foamy WOT 4 and prepared it for flight.

By this time I would describe the wind as being a 'nasty' wind - not just cold but even stronger and more blustery. Jake is never one to be put off by such minor considerations and took off and commenced a spectacular aerobatic flight which I will remember for a very long time.

I think he did every manoeuvre in the book including a few low level inverted passes. It was as though he didn't really accept that such an unpredictable wind should affect the way he flew! His final flourish with the model was to point the nose into the wind and land allow it to come down vertically into that squelchy grass.

I so wish I had half the flying skill of this guy.

A VIEW FROM THE HEDGE. (By Will Sparrow)

As I'm sure that you're aware, October is not only the season of mists and mellow fruitfulness… it is also the month of the spider. Already, on a cold morning, I have noticed the flying field covered with gossamer webs – the evidence of the presence of many thousands of spiders. At this time of year the spiders emerge, the larger females to fatten up for the winter and the males to seek a mate. I was watching a bit of spider activity in our hedge only the other day; the dew marked the web of a fat female. A male spider approached, tugged at her web in order to attract her attention and released pheromones to let her know that he was a potential mate and not lunch! The pair of them seemed to be getting on quite well, snuggling up, becoming as one. Quick as a flash I made my move and gobbled up the pair of them. Yum! There is nothing like having a pair (brace?) of spiders for breakfast.

Not only is October the month of the spider, it is also the month (for this year at any rate) of rain and gales. There has been the odd member venturing forth for a look-see and even the odd committed type taking to the air but, in all honesty, it's weeks since I was able to put the famed viewing twig to any significant use. I'm aware that several of your members have been working towards their "A" certificates (some rather more than others!) but many have been caught out by the rapid onset of the bad weather. There was an exception: one candidate was on the ball and managed to pass his test before summer evaporated towards the end of September. It's never easy to face a test or examination, especially when fellow members are watching from the pits. Even the most confident admit to a slight dose of nerves. I remember my own GFT when, having recently fledged and put in plenty of practice, I had to demonstrate my skills before being given the freedom of the skies. I got my cross-wind twig landing completely wrong… I put it down to nerves (I put it down to incompetence! – WOO). Luckily, I was given a second attempt the same day and, much to everyone's surprise, I passed. I've never looked back (give me strength! – WOO).

The bad weather can't last for ever so there is still time for the determined member to take his "A". Why not spend enforced indoor time snuggled up with the BMFA handbook and testing yourselves on the compulsory questions? Watch the "How to pass your "A" videos on the wondrous BMFA website. How I envy you!

WS

Congratulations to Andy Moore

Andy passed his BMFA 'A' level examination. The test was carried out by John Higgins. I was hoping to get a picture of Andy being presented with the certificate but regrettable don't yet have one but will be pleased publish it in the next issue.

Another shot of Jake's WOT 4

Glider Set Up

October 2019

Article by Brian Holdsworth

There are several objectives in the first flight of any model, often continuing over several flights to complete satisfactorily. It is easier to determine these with light winds, when the air will be smoother, since turbulence tends to mask any trim errors. The descriptions assume electric power, though similar flight patterns would be used for models launched off a slope or via towing. Much is also applicable to power models. In some respects, a glider is easier to trim than a power model where thrust line errors, torques and the spiral propeller wash have considerable disturbing effects, confusing diagnosis.

Obviously, control surfaces need to operate in the correct directions with free movement and sufficient robustness in the linkages etc. to avoid blow-back from the airflow. Excessively flexible linkages would allow any trimmed control surface offsets to reduce with increasing airspeed making satisfactory trimming difficult. Similarly, flexing wing, tail or control surfaces can produce confusing effects. The lateral balance needs to be checked and corrected if needed - one wing may be heavier than the other, and a side-mounted engine or offset silencer will need to be balanced by some weight in the opposite wing tip. Any twists in the wings etc. also need to be identified - while unfortunate and difficult to correct, the flier would be ready for the resultant trimming difficulties. Some washout, where the wing tip has a slightly lower angle of attack than the root (typically 3 to 5

Glider Set Up Continued/.....

Article by Brian Holdsworth

degrees), is commonly used for high aspect ratios to improve stall characteristics, but the sides need to match.

The starting point is with control surfaces centred and the CG and control throws set appropriately. ARTF manuals or plan notes should include values, though some are wildly inappropriate!. Generally, the CG should start at the forward position of the quoted range and initial control throws set relatively low, especially for an aerobatic type where over-control of an out-of-trim model is a frequent cause of problems - switched rates are useful here. An own-design model would use experience or settings from similar examples as a starting point. Eventually, settings should be adjusted to achieve the required performance compromises, even if somewhat different from the quoted values.

The trim settings for straight and level flight, descending slightly for a glider, need to be established as a baseline for the subsequent assessments. Control responses may suggest changes in CG position, control throws and perhaps exponential settings to adjust control sensitivity around neutral stick to achieve the desired results. Mixer settings may be identified to adjust coupling between controls and model responses. The unsuitability of some design parameters for the desired usage may become apparent which would be unfortunate - operational limitations may have to be accepted! It is helpful to perform stall tests to identify the behaviour on entry and the recovery performance - a repeatable wing drop may suggest wing twists or lateral balance issues. A high aspect ratio, as commonly used for gliders, is more likely to drop a wing on stalling. Violent stall characteristics would need considerable care during the landing approach since a stall at low level might not end well!

The first flight can be somewhat stressful since trim errors may suggest problems! It is easier to perform trimming into wind since the ground speed would be reduced, allowing longer for assessment and adjustment. Any wind drift could cause confusion in identifying any turning tendencies. Also, the model needs to be fairly low and close for good visibility. The first circuit should thus be completed with stick offsets applied to correct any trim errors before straightening out into wind, with no power, for any corrections to be applied and detailed assessment made, with several circuits generally needed to complete.

Glider Set Up Continued....

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Article by Brian Holdsworth

The digital trims on current transmitters have the disadvantage of being slow to make significant changes. While their auto-repeat feature would speed up the correction if the trim button is held continuously, it is generally easier and more predictable to use rapidly repeated clicks for adjustment. If the trim is wildly out, it may be helpful to use the sticks to over-correct the attitude allowing longer for trim adjustment before the model deviates too far from straight and level. For example, a left turn error would be trimmed by banking to the right 30 degrees or so before clicking the trims, correcting again if needed before an excessive left turn develops.

Aileron trims are adjusted for straight flight with the wings level, indicated by no rolling or turning. If the wings are not level, a turn would result even with correct trims. Rudder trims should not be touched - as covered earlier, rudder-elevator models should control the rudder through the aileron channel. For a glider, elevator trim is used to control the speed and the setting for minimum speed needs to be determined as a reference.

As up-trim is added, the model will slow and adopt a more nose-up attitude. As the minimum speed is approached, control response becomes sluggish which can be a useful indicator of an imminent stall. When the airspeed drops below the minimum, a stall will occur and the nose will drop. Having determined the trim for minimum airspeed, the normal trim is established with a few clicks of down trim until the flying attitude becomes more level, producing a slightly higher airspeed which is the slowest practical setting and the basis for further assessment and adjustments.

Pitch stability is a very complex subject and CG position has a considerable effect. Design parameters such as wing section, plan form and incidence (angle between the wing and tail) together with tailplane area and tail moment (distance between the wing and the tail) also have effects. Only the CG is easily adjustable with the other parameters being defined by the design for the intended usage. Too much pitch stability would make flying the model very difficult as any change in airspeed, including wind gusts, would produce significant pitching changes. In general, some elevator application will be helpful to improve stall recovery. In normal level flight, all aircraft will have slight pitch undulations, referred to as a

Glider Set Up Continued....

Article by Brian Holdsworth

phugoid. These are usually invisible from the ground, but would be apparent if a forward-facing camera is fitted when the horizon would be seen to rise and fall slowly by a small amount during steady flight.

For a thermal soarer, some pitch stability is desirable, as covered earlier, and a useful stall characteristic would be where the nose drops slightly before levelling out again as the inherent stability converts height into airspeed - several reducing cycles may occur depending upon the severity of the stall. The behaviour around the stall, and particularly recovery, is an indicator of the degree of stability and the need for CG position adjustment may be apparent. Typically, the usable CG range would be between 25% and 30% of mean chord though some design parameters can have considerable effects, changing the range.

Dive tests are widely used for full-size aircraft to confirm predictions and can be useful for models. Generally, only shallow dive angles are appropriate, up to 20 degrees or so, since other factors become significant for steeper angles. In a dive, the airspeed will increase and the pitch stability generates correcting forces to recover towards level flight. As the CG is moved forward, the amount of up-trim needed for level flight will be greater, increasing pitch stability so that recovery becomes quicker. As the CG is moved back, the up-trim will be reduced, possibly becoming down-trim, and stability is reduced slowing recovery. At some point, there will be no recovery and the model will continue its dive. This is often referred to as neutral stability, which can be a desirable state depending upon the intended usage. If the CG is moved further back, the dive will tend to steepen and the model may "tuck under", frequently becoming stable in an inverted dive.

The effects of the CG position on elevator response may be likened to under-steer or over-steer on a car. A forward CG produces an under-steer effect with a sluggish, but predictable, response which may become inadequate at lower airspeeds so that insufficient elevator authority may be available to lift the nose for the landing flare. There may also be insufficient control to invoke a stall and spinning becomes less likely. An aft CG produces an over-steer effect with responsive elevator control tending towards over-control; this may be seen where, for example, the vertical recovery from a square loop tends to tighten. Spinning becomes easier to the point where recovery becomes difficult, with a

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October 2019

Article by Brian Holdsworth

greater tendency to re-enter a spin. As the CG is moved too far aft, this over-control becomes increasingly apparent with difficulty in maintaining level flight until the position is reached where the model only becomes stable when the wing is producing no lift, flying vertically up or down. Elevator would then have little effect until some lift is generated when the model would pitch violently into the opposite state - it would be wise to avoid this since a second chance is unlikely!

There is another solution to the stability equations where the CG is positioned well aft, maybe 70%+, so that the tailplane provides upward lift and the configuration becomes that of a tandem wing. This is commonly used for free-flight contest duration models with large tailplanes, but their stability is marginal and they are prone to "tucking under" and often meet their end in an inverted dive into the ground. Personal experimentation with such a configuration had some success, but any performance gains seemed too small for the resulting problems from erratic performance in turbulence. This suggests that CG positions of the order of 40% to 60% become a "No Man's Land" best avoided!

Club Instructors

Jason Reid, John Higgins, Chris Vernon, Mark Conlin, Brian Holdsworth, Jim Sheldon, Paul Cusworth, Andy Harrison, Justin Goldstone , John Prothero

Club Events 2019

Saturday 2nd November at the field Bonfire Night with fireworks & Spectacular Night Flying Display.

Wednesday 6th November Mark's Futaba Night & Dave's Turbine Night.

Thursday 5th December Annual General Meeting.

Thursday 19th December Quiz Night and Hot Pot Supper.

In Conclusion

As always, I am very grateful to you gentlemen who have kindly contributed to this newsletter. I also appeal to any of you willing to also put pen to paper to share your experiences. When I sat listening in the Club hut, the enthusiasm was almost infectious. It is an exciting hobby and you all have so many interesting experiences which would make this newsletter so vibrant in it's content.

Anyway, building time is rapidly approaching and that is something I find really absorbing. I have a Super 60 to build which will be electric powered and finished in a decent quality transparent film. I love to be able to actually see the construction of these vintage models after all the work you put in to building them. I'm also looking forward to see John's new Fournier RF4. Happy flying guys.