JUN 07

News from
Barton MFC
"Shoulder to shoulder with champions"

Free to members

Vol 9 Issue 2

Circle Talk

www.controlline.org.uk

The BASH weather's a pain, rains mainly on the planes

Carrier model attacks unsuspecting victim? No? Okay, so it's actually Ian Gilbert's "Grumman Guardian" right on the 30° limit during the slow run of his winning flight at the 2007 BASH. *[Photo and caption by Andy Housden - report inside. More BASH results next issue.]*

What's coming up at BARTON?

BARTON GOODYEAR
Tel: A Eifflaender 01625 61

3rd June
British GY + Open GY

8th July
British GY + Mini GY

5th August
British GY + Mini GY

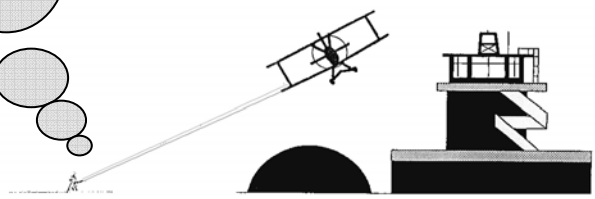
IMPORTANT!
All intending organisers of events on the Barton circles **must** check availability of dates beforehand with **Ray Lloyd**
Tel: 01706 212184 or *Email:*

Nervous? Of course I'm nervous! Out here in the middle with all that crowd looking on – each knowing better than me what to do...

[Maurice Leyland, cricketer]

CLUB MEETINGS

Please note that the former Lancs Aero Club rooms will not be available during the summer for monthly Friday night meetings (replaced until further notice by flying evenings on the field).



BARTON BASH RESULTS
12-13th May 2007

[Weather - Saturday: 11-14° C, WSW wind 6-14 mph, 98% cloud, sunny intervals, showers; Sunday: 8-13° C, ESE wind 4-8 mph, 100% cloud, sunny intervals, steady rain in afternoon]

The Carrier Deck Circle

BASIC CARRIER

CD Andy Housden reports:

Aargh! The BASH is usually one of the best attended Carrier contests in the calendar but accurate weather prediction was the bogeyman this year! The Friday forecast was windy, wet and cold, with the result that many of the usual stalwart Carrier flyers chose the 'fireside and slippers' weekend option instead. *Wrong decision, chaps!* Although Sunday afternoon was undoubtedly spoilt for everyone at Barton by light but continuous rain, the weather right up to that stage had been entirely flyable.

Nevertheless, Carrier pilots still turned up - and from as far afield as Ipswich and Bournemouth. They found that even though the usual start-of-season cobwebs needed blowing away, conditions were actually good enough for some high scores.

Top of the class was **Ian Gilbert**, who had got his eye well and truly in by Sunday morning when he returned an excellent flight in which the engine was right on song for the fast run, the model right on the 30° attitude limit throughout almost the entire slow run - with not a single warning, either! - and the landing approach perfect, all the way down on to the No.1 wire of Barton MFC's *HMS Basher*. (Good name, eh?).

Nigel Crabtree spent some time during Saturday playing with his engine setting, as it had been giving him problems with late throttle pick-up during the slow run. His best flight turned out to be a relatively cautious affair in which there was a still lot of see-sawing during the slow run, but he rounded it off with a landing that was spot-on, exactly along *HMS Basher's* centreline to produce a score that was good enough for second place.

Graham Sweeper brought both his windy weather *and* calm weather models! Saturday's conditions were good enough for the latter and he could have produced a very worthy third place after an extremely well-executed slow run that would actually have given him a personal best score (and one that would have been less than 4 points behind Nigel Crabtree) had his landing approach been just that weeny bit higher - but it wasn't! *Wham!* The resulting ramp strike bounced the model right over all the wires, lost him his landing points and dropped him out of the trophies. Shame!

Darren Hustwick had spent some of the winter building season producing a new lightweight version of his 2006 model and the maiden competition flight of this was particularly successful. He thereafter put in some very workmanlike flights with it and whilst his low speed flying wasn't quite as slow perhaps as that of Graham Sweeper, his landing approaches were a little more consistent, with the result that he slid into third place ahead of Graham. Well done, that man!

Andy mans the island

Arthur Garnett suffered from some engine setting problems and although he produced some spirited flying with his very well-built and realistically painted model, the motor runs let him down and meant that all flights were terminated early by ditching. His final flight was rather more spectacular after the model suffered from a very unlucky control system glitch that left it directly overhead, but with no line tension. *Crunch…* Oh well, back to the drawing board! ***AH***

BASIC CARRIER *(5 Entries) CD: Andy Housden*

Pos	*Pilot*	*Club*	*Model*	*Engine*	*Points*
1	Ian Gilbert	Ipswich	Grumman AF Guardian	Webra 40	230.6
2	Nigel Crabtree	Sheffield	Grumman AF Guardian	OS 46	196.8
3	Darren Hustwick	Colne	Grumman F6F Hellcat	MDS 40	175.0
4	Graham Sweeper	Bournemouth	Grumman AF Guardian	Thunder Tiger 46	93.0
5	Arthur Garnett	Colne	Grumman F6F Hellcat	MDS 40	Disq

CARRIER

Janice Shepherd *[below]* releases Nigel Crabtree's *Grumman Guardian* aboard *HMS Basher*

Ian Gilbert *[right]* launches Graham Sweeper's *Grumman Guardian* from *HMS Basher*

[Above] Septuagenarian Carrier Aviation! Arthur Garnett shows the youngsters how it's done with his *Grumman Hellcat*. Grey sky!

All photos and captions on this page by Andy Housden

[Above] Ian Gilbert's *Grumman Guardian* makes a perfect descent on to *HMS Basher's* No.1 wire!

[Below] Just about to pick up *Basher's* No.1 wire! Darren Hustwick's new light-weight *Grumman Hellcat* makes the perfect end to a good flight

Darren Hustwick *[below]* releases clubmate Arthur Garnett's *Grumman Hellcat* from *Basher*

[Left] The joys of Carrier flying! Graham Sweeper pilots his *Grumman Guardian* through low speed flight

He loves it! Arthur Garnett *[above]* with *Hawker Sea Fury*

BARTON BASH 2007 (Cont'd)

Grass Circle Racing and Speed

MINI GOODYEAR

Heats: 100 laps, 3 stops. Final: 200 laps, 5 stops.

ROUND ONE

Heat	*Pilot*	*Pitman*	*Time for 100 Laps*
1	Morrisey	Heaton	5.32.79
1	Flack	Springham	5.26.45
1	Ross	Bradley	7.08.45
2	Eifflaender	Eifflaender	5.02.60
2	Morrall	Dalglish	4.35.50
2	Waterland	Lever	Retd lap 61
3	Eyre	Winstanley	Retd lap 95
3	Broadhead	Buys	Retd lap 62
3	Fitzgerald	Langworth	5.08.00
4	Jill Brown	Barker	6.26.05
4	Broadhead	Buys	5.27.02

ROUND TWO

1	Eifflaender	Eifflaender	4.19.06
1	Waterland	Lever	Retd lap 98
1	Flack	Springham	4.51.03
2	Hart	Hart	7.31.60
2	Eyre	Winstanley	6.51.17
3	Ross	Bradley	7.31.60
3	Jill Brown	Barker	6.16.44
3	Hart	Hart	6.57.54

FINAL

Pos	*Pilot*	*Pitman*	*Time for 200 Laps*
1	Eifflaender	Eifflaender	8.45.28
2	Morrall	Dalglish	8.55.69
3	Flack	Springham	9.55.65

CD Roger Reese reports: In a fast and furious final between three extremely quick models, Eifflaender and Dalglish both used extensively reworked PAWs, while the Flack team elected to use a plain bearing CS 09.

Eifflaender and Dalglish fought hard, the two models having very little difference in airspeed, but the Dalglish model just seemed to have the edge, so making pitting the difference between winning and losing. A very closely run race – 10 seconds separating Dalglish and Eifflaender – saw the PAW 'works team' take the honours. ***RR***

CLUB SPEED

Any 1.5 cc plain bearing motor in any design model flown on 13.5 m x .012" lines; first lap not timed, followed by 10 timed laps.

ATTEMPTS

Pos	*Pilot*	*1st*	*2nd*	*3rd*
1	Morrisey	20.3	**20**	-
2	Morrall	20.7	20.2	**20.2**
3	Long	22	**21**	21.1
4	Walker	-	36.5	**22.5**
5	Isidro	27	25	**24**

CD Roger Reese reports: Club Speed was a relaxed affair and anyone wanting to enter this unique competition could arrive at the MGY Circle and make up to three attempts. Most took advantage of Saturday morning's still air and dry conditions.

First to go were **Walker** father and son, using a Hallam short-wing speed kit, PAW powered and with a grey Graupner 6"x 5". At their second attempt the howling motor recorded a very respectable 22.5 secs/10 laps. **Ken Long** was second up and, although with ever improving times, ran out of attempts to attain the fastest of the day – this with a Don Haworth tuned PAW with lots more to come.

Ken Morrisey dug out his old *Midge* speed model, complete with rubber bands to retain the front cowl, and proceeded to show how it should be done by recording the fastest of the day at 20.0 secs/10 laps.

BARTON BASH 2007 (Cont'd)

CLUB SPEED (Cont'd)

Julio Isidro was flying the Hallam asymmetrical model and, although showing an improvement at each attempt, ran out of time to demonstrate the model's potential.

Len Morrall chose to use his Mini Goodyear model and a grey Graupner 6"x 6" prop and was so very close to the fastest time of the day. Even without the benefit of a smaller, streamlined model, he recorded consistent attempts, both of the last two being 20.2 secs/10 laps.

In summary, the best times were set in Saturday's dryer, windless conditions. Those who chose to leave it until Sunday were unfortunately affected by the wet and windy conditions. **Ken Morrisey** ran out a worth winner but I would suggest that his supremacy is soon to be challenged – perhaps in the next competition? ***RR***

Remaining results and reports (tarmac circle racing and aerobatic circle) to be published in next issue.

SOMETHING FOR THE WORKSHOP?

"My thanks to David Beales for putting me on to the ultimate gunge zapper: 'X-tend Air Intake and Carburettor Cleaner' (to give it its full title)… ***writes Peter Michel in the January 2007 "New Clarion" on-line Vintage FF Newsletter from SAM 1066 (at www.cabgrove.freeserve.co.uk/sam.html).*** "This king-size aerosol shoots out a rushing jet of some wonderful concentrated foam that hoses away every speck of grime and dirt in its path.

"The need for some such cure-all became apparent when one of my treasured KSB timers suddenly became a "stopper". Inspection with a powerful magnifying glass revealed tiny bits of heaven-knows- what in the works. It was then that David, a vintage car buff, suggested 'X-tend', which I got at the local Pit Stop. Two squirts of this awesome spray and the works of the KSB were as clean as a whole orchestra of whistles and the timer was functioning again.

"I have also reclaimed two sulking Tomy timers and persuaded a crude but attractive Edwardian pendulum clock to tick-tock again after many years of silence on its shelf. (The local clock repairer quoted £60 to do the job). 'X-tend' sells at £6.99 for a king-size aerosol which, for our small needs (contact-breakers on spark motors, for instance), should last half an aeromodelling life time. A workshop must".

BARTON CLASSIC 15 TEST DAY

CAPTIONS TO PHOTOS OVERLEAF

1. Sid Peart brought and flew this model that Alan Laurie and Alan Wallace used to win the 1962 Nationals – and with the very same Oliver Tiger III!

2. Geoff Walker displays a musician's natural hold on his CS Oliver powered *Long John.*

3. VTR President Dave Finch brought several models of the era. This is his KK Demon with Eta 15.

4. Dave Copeland holds his beautiful KMD powered *Tigress.*

5. Fora 15, the proposed standard powerplant for Classic 15.

6. As with fellow countryman Dave Copeland, Dave Roberts' weapon of choice was the Ken Long classic *Tigress* but with Eta 15.

7. Harry Walker installed a CS Oliver in his original *Jeffenova* that displays classic lineage.

8. Yet another replica produced by Dave Finch was this Oliver Tiger powered Mac Grimmett racer from 1959.

9. This venerable model by Bernie Langworth became the test-bed for the Fora sample on test.

10. There's a recent trend for racing men to move into stunt but it seems that aerobatics man Dave Roberts is rediscovering the thrills of racing. (Looks more like a *Razzamachas*, perhaps, than a Classic 15 model?).

11. That VTR man again. Original *Roja Broja* of Dave Finch suffered from mechanical failure in Super Tigre.

12. Free flight modeller John Cuthbert *[left]* and Mike Fitzgerald display John's *Thingy* and *Cuttinedge* original designs, both with Oliver Tiger IV power.

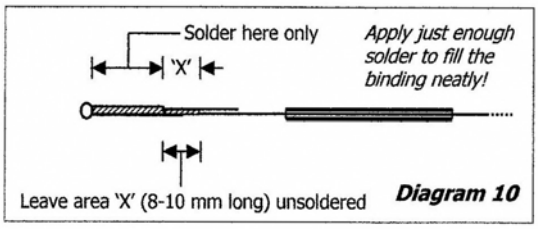
13. Mr. Morrall makes friends with Scottish visitor holding an Eta. (Lenny. Really. Wants. That. Motor.)

[All photos on page 6 by Fred Hall]

CORRECTION

Reliable Line Ends and Leadouts

A tiny editorial drafting error – found too late! - crept in to Diagram 10 of John Allcock's account of his methods published in the last issue. (It involved the unsoldered area 'X'). While we suspect that any *CIRCLE TALK* readers who spotted it are too knowledgeable to have been deceived, here for the record is the *correct* version of the diagram.

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Roja Broja

RACING

BARTON CLASSIC 15 TEST DAY
"The First Ever" on 25th March 2007

Roger Reese reports:

A fine turnout of 'diehards' was at the first meeting of the year at Barton to witness the first official outing of the newly introduced class 'Barton Classic 15'. A full day of testing was the order of the day and five teams took to the air, mostly with unflown and untried models. Surprisingly, spectators outnumbered flyers but all the models were aired on what was a cool, bright and windy day.

The Runners and Riders

Owner	Model	Designer	Engine
Dave Copeland	Tigress	Ken Long	KMD
Sid Peart	Own Design (1966)	Sid Peart	Oliver Tiger III
Sid Peart	Wallace FAI (1963)	Allan Wallace	Oliver Tiger III
John Cuthbert	Thingy	John Cuthbert	Oliver Tiger IV
John Cuthbert	Cuttinedge	John Cuthbert	Oliver Tiger IV
Dave Roberts	Tigress	Ken Long	Eta 15 Mk.1
Dave Finch	Demon	KeilKraft Kit	Eta 15 Mk.1
Dave Finch	Grimmett FAI (1959)	'Mac' Grimmett	Oliver Tiger IV
Dave Finch	Roja Broja	Dave Finch	Super Tigre G15 RVD
Dave Walker	Wallace FAI (1963)	Allan Wallace	Oliver Tiger III
Geoff Walker	Long John	Mike Bassett	CS Oliver Tiger Repro
Harry Walker	Jeffenova	Harry Walker	CS Oliver Tiger Repro
Bernie Langworth	Muncaster 1	Jack Muncaster	Fora 2.5 'Barton Special'

Practice began at 11.00am and solo flights were the sensible option. As with all new models, teething problems were here to be sorted. The most common was the mono-leg undercarriage failure (at the fuselage) that resulted in a curtailed session for the very beautiful *'Jeffenova'* model of the *Walker/Walker* team.

Walker/Peart struggled all afternoon with the latter's *'Wallace '63'* before finally withdrawing the model to be sorted at a later date. They then resorted to their second model *'Cuttinedge'*, which showed good airspeed and consistent lappage.

Roberts/Copeland played safe with the trusted Ken Long designed *'Tigress'*, powered by a Russian KMD. After sorting out a rotating needle valve, they were able to put in some good, fast practice runs.

Finch/Ward's 'Roja Broja' (*"Red Witch"*, I am reliably informed!) showed much promise during practice but was to fail with a broken drive pin to the Super Tigre rear induction motor, providing more work for Dennis Ward before the model will get aired once again.

Fitzgerald/Cuthbert flew their *'Thingy'* to great success but, after losing the cowl and being unable to secure it properly, brought out their second model to use in anger.

The *'Cuttinedge'* was flown to the finish by Mike Fitzgerald in a faultless race and was most ably pitted by the designer/builder, John Cuthbert, who confessed to being a "novice pitman". Well, if you ever want to pit one of my models, John, please let me know because on the day you were faultless!

RJR

First Barton Classic 15 Trial, 25.03.07

Heat	Pilot	Pitman	Time for 100 Laps
1	Finch	Ward	Did not finish
1	Roberts	Copeland	Race stopped
2	Fitzgerald	Cuthbert	4.58.1
2	Roberts	Copeland	84 Laps

[Acknowledgments to 'Classic 15' contributors Roger Reese, Fred Hall, Malcolm Ross and John Whiteside]

THE FORA 15 FOR CLASSIC
by Malcolm Ross

Unsurprisingly, the talk at the "trials" was all about which motor was going to become the standard. We were able to test the Fora 15 in the circle on the day and this engine starts and runs very well. Flying it in one of Bernie Langworth's airframes, it delivered good speed and range.

The engine is available from Mervyn Jones for £65.00. A £20 deposit now will secure delivery. Phone Mervyn on 01943 466377 to reserve your motor (or e-mail mervynjones@dsl.pipex.com).

RACING (Cont'd

BARTON GOODYEAR MEETING
British Goodyear, 29th April 2007

[Weather: 17-19° C, ENE wind 10-14 mph, sunny, dry, 5% cloud]

Tony Eifflaender reports: Sunshine and a fresh but not troublesome wind greeted the eleven teams that came from as far afield as Fyfe up north and Gloucestershire down south. Practising was a brisk affair with some rusty pitmen but few problems.

Round 1 started at 11:30am prompt with Heats 1 and 2 showing a lot of rust and scrappy stops, with the exception of *Dalglish/Worgan* who put in a steady 4:36. Heat 3 saw the *Eifflaenders* put in a fast but not clean 4:24 against *Bowman/Bellamy* (6:16) and *Morrall/Hutchison* (who were disqualified). The last heat in the round saw *Millar/Court* record 5:05 for third place in Round 1.

Round 2 saw *Bowman/Bellamy* improve to 5:41, while *Catlow/Jephcott* had a troubled run with an MDS to record a slow (for them) 5:41. The *Eifflaenders* could not improve over Round 1, whereas pilot *Tom Meager* (a junior) and partner *Mike Bellamy* scored a 6:00 dead. In the last Heat of Round 2, *Dalglish/Worgan* scored an improved 4:31 and *Cannon/Cannon* recorded a superb 5:05.

Round 3 saw limited action with the top teams sticking with their earlier times. *Eyre/Winstanley* scored a solid 5:40 but the big improvement was *Meager/Bellamy* winning their heat with a time of 5:40. An incident in practice saw *Catlow/Jephcott* bring out their best model to record a good 4:57, enough for third place in the Final. *Roberts/Copeland* tried in vain for a good time but a mixture of misunderstandings gave them a hard day at the office.

The winter building season has seen some nice new models built, including a sweet '*Lil' Quickie'* from *Cannon/Cannon* and a brace of '*Deerfly'* from the *Bellamy* stable. However, the 'old guard' was sticking with last year's kit. I am pleased to record that the new APC 7x5 props, with the thicker-root blade, worked very well with no thrown blades to report. (Many thanks to Ripmax (Irvine) and APC!).

4:30 saw the ***Final*** arrive and the *Eifflaenders* in pole with 4:24, then *Dalglish/Worgan* with 4:31 and *Catlow/Jephcott*, 4:57. The *Eifflaenders* were away first but were soon passed by the fast MDS of *Catlow/Jephcott*. As things settled down it was obvious that this was going to be a cracking Final.

All the models had similar airspeed and, whilst *John Catlow* and *Chris Eifflaender* slugged it out in the middle, *Martin Dalglish* was waiting to pick up the pieces and, with the aid of metronomic pit stops by *Martin Worgan,* started to eke out a lead. Then, disaster came at Stop 2 for *Catlow/Jephcott*, who broke a prop, virtually ensuring them third place. At Stop 3, *Tony Eifflaender* dropped a rocket-like landing by *Chris,* thus sealing their fate and second place. Meanwhile, *Dalglish/Worgan* eased home with slick pit work for a well deserved win.

It was a super final to round off an enjoyable day in which, also, young *Tom Meager* was awarded 'man of the match' for his skilful first race completion.

Thanks are due to all who helped to run the event, especially Andy Dalglish for a superb job as Circle Marshal *[and not forgetting Tony Eifflaender himself for his promotion and sponsorship of the day's racing. Ed].*

AE

BRITISH GOODYEAR *(10 entries)*

Pos	*Team*	*Heats*	*FINAL*	*LEAGUE*
1.	Daglish/Worgan	4.31.0	9.22.0	25
2.	Eifflaender/Eifflaender	4.24.0	9.40.0	24
3.	Catlow/Jephcott	4.57.0	192 laps	23
4.	Millar/Court	5.05.4		22
5.	Cannon/Cannon	5.05.6		21
6.	Morrall/Hutchison	5.10.0		20
7.	Eyre/Winstanley	5.34.0		19
8.	Meager/Bellamy	5.40.0		18
9.	Bowman/Bellamy	5.41.0		17
10.	Roberts/Copeland	45 laps		16

AEROBATICS

CENTRALISED F2B MEETING
14th April 2007 at Barton

RESULTS

Pos	*Pilot*	*Rd.1*	*Rd. 2*	*Rd.3*	*Total*
1.	Robert Kitley	**879.0**	**871.4**	850.7	1,750.4
2.	Roy Cherry	**870.5**	832.3	**858.0**	1,728.5
3.	William Draper	771.5	**833.4**	**787.0**	1,620.4
4.	Steven Smith	670.0	**715.4**	**771.8**	1,487.2
5.	John Alcock	619.0	**649.5**	**662.0**	1,311.5

CD Ray Lloyd comments: We were completely underwhelmed with just ***five*** flyers competing. However, they flew in *perfect* weather conditions *and* had a tarmac circle to do it on and we even had spectators who came to watch… so ***where*** was every one else? Have the stunt flyers of Britain lost interest or is it the hibernation syndrome? I don't know, but it's a mystery to me! *RL*

AND ANOTHER BARTON MFC COMPETITION SUCCESS!
Fred Hall was the delighted winner of the *second* prize in the PFA NW Strut's Grand Christmas Draw and which comprised a meal for two at Leo's Fish Bar!

A NEW AVIATION ENGINE

[Brian Winstanley drew attention to the following two articles (abridged and reproduced here from the PFA NW Strut Newsletter with thanks). Although referring to full-size practice, they should interest many Barton CL flyers also – Ed]

OPPOSED-PISTON TWO-STROKES

… the background by Bob Pick

About a year ago it was announced that Mike Howells had acquired a licence to manufacture an engine called the HAE-100, based on the DAIR-100, designed by David Soul (*not Hutch!*) of Diesel Air Ltd. This engine, or parts of it, has appeared a number of times at PFA Rallies in recent years at both Cranfield and Kemble and is aimed at the replacement market for engines such as the Continental O-200, having the same mounting points as the O-200. It is a two-cylinder, opposed-piston two-stroke. This type of engine has no conventional cylinder head; it has a long open-ended cylinder, with a piston operating inwards from each end, and has one or more conventional fuel injectors at its mid point. During compression the pistons approach each other and combustion takes place in the space between the piston crowns. This particular engine has horizontal cylinders with a crankshaft at each side coupled together by a train of phasing gears, with the propeller being driven from the gear in the middle; it uses two injectors per cylinder.

Opposed-Piston Types

Probably the engine of this type best known to aeroplane people is the Junkers of the 1930s and 40s, but military people would know of the Leyland L60 multi-fuel engine used in the Chieftain tank in the 1950s and 60s, and the Rolls-Royce K60 used in smaller armoured vehicles. These engines all have vertical cylinders with crankshafts at the top and bottom. Marine people would know of the Napier Deltic (mechanically more complicated in that it has three separate cylinder blocks and three crankshafts, but just the same in principle), which was first used in fast patrol boats and minesweepers, and then in diesel-electric railway locomotives. The Junkers engine in the photograph *[see page 10]* has three vertical cylinders with the propeller being driven by the first gear down from the top crankshaft.

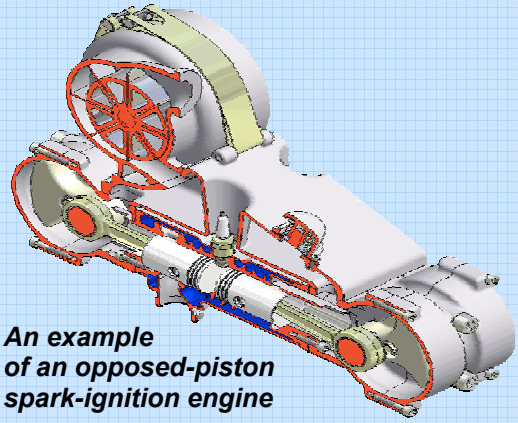
Opposed-piston engines are not limited to engines with each piston connected to its own crankshaft. There were numerous others with a single crankshaft where the piston remote from the shaft was connected to it by side rods. The engine which gave its name to this configuration was a large gas engine made by Oechelhäuser, which Hugo Junkers worked on as early as 1892. That engine was horizontal, but the Doxford marine diesel, which was made until at least the 1970s, in powers up to 20,000 bhp, was vertical.

Another configuration had a single crankshaft with both pistons connected to it by rockers. The one best known in this country is the Rootes TS3, used in Commer lorries and buses of the 1950s, but there were earlier engines, including one made by Sulzer in the 1930s. The notable difference between the Rootes engine and the Sulzer illustrated below is the piston-type scavenge pump on the top of the Sulzer; the Rootes engine had a Roots (*no "e"*) blower on the free end.

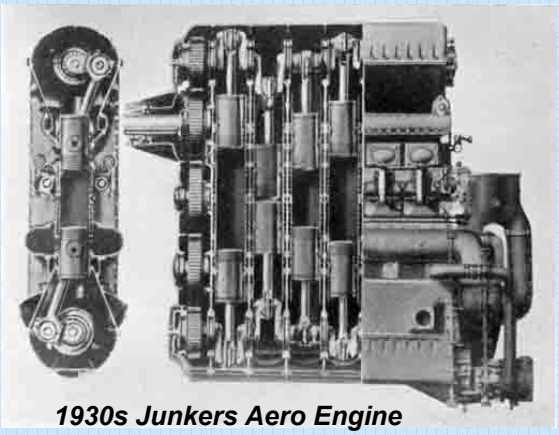
Why Opposed-Piston?

The opposed-piston arrangement is one solution to the problem that all designers of two-strokes have to face, how to scavenge the cylinder effectively during the gas exchange period. A four-stroke engine has the well-known four operations: induction, compression, expansion and exhaust. Between the exhaust and induction strokes, the piston comes to top dead centre (TDC), when the cylinder is at its minimum volume, so if traces of exhaust products are not totally replaced by new charge, it is not very important. In a two-stroke, compression and expansion are the same as in the four-stroke, although perhaps a bit shorter, but the whole gas exchange process of exhausting combustion products and replacing them with a fresh charge has to take place between exhaust opening and inlet closing, in about 120°-140° of crank angle round bottom dead centre (BDC), when the cylinder volume is at its maximum.

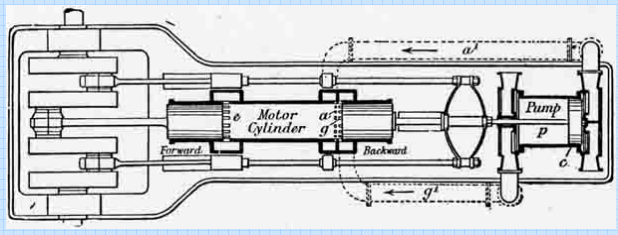
The simplest two-stroke is the three-port crankcase-compression engine. The new charge is fed first into the crankcase by a port uncovered by the piston skirt just before TDC. From there it passes through a transfer port to the upper cylinder which is opened by the piston crown just before BDC, with the under-side of the piston acting as a positive displacement scavenge pump. An exhaust port is opened by the piston crown a little before the transfer port. Engine designers, over many years, have used much ingenuity to get as much of the burnt gas to go out through the exhaust port as possible, with as little as possible of the new charge with it, particularly if the new charge is a petrol mixture.



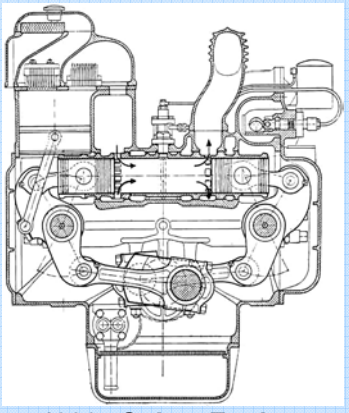
An example of an opposed-piston spark-ignition engine



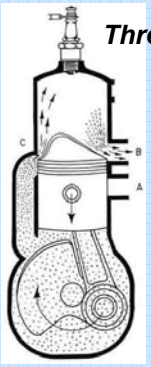
1930s Junkers Aero Engine



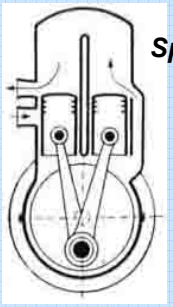
Early Oechelhäuser Gas Engine



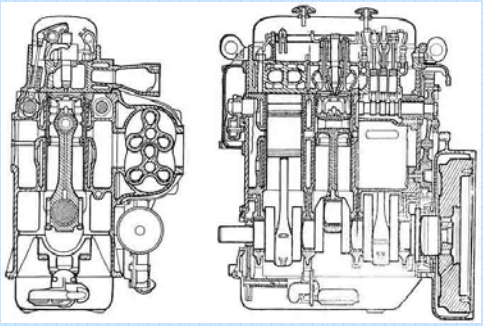
1930s Sulzer Engine



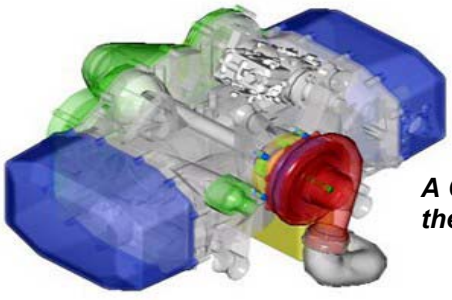
Three-Port Engine



Split-Single Engine



General Motors 71-Series Engine



A CAD view of the DAIR Engine

The HAE engine on its test stand

The barrel of the HAE engine

NOTE: All illustrations on this page courtesy of PFA NW Strut Newsletter (Editor, Susan Dunn)

OPPOSED-PISTON TWO-STROKES (Cont'd)

A solution which found some favour in petrol engines was the "split-single" engine. In this engine the two cylinders have a common cylinder head but the inlet, or transfer, port feeds into one cylinder and the exhaust port feeds out of the other. The ports are widely separated, introducing a form of uniflow scavenging, and the arrangement makes possible a desirable phase angle between the port timing. Unfortunately, it also produces an unfavourable combustion space, with a lot of surface area leading to excessive heat losses. I do not know of it being built as a diesel.

If you are prepared to accept the complication of valve gear, then a solution which has been used successfully for many years, particularly for diesel engines, is the exhaust-valve-in-head uniflow engine. Fodens of Sandbach made an engine of this type for its vehicles for a number of years after WWII and they also made a non-magnetic version for naval mine-hunters. A much more recent engine is the Wilksch. However, over the years the major player has probably been General Motors, with their 71-series vehicle engine (only recently being displaced by four-strokes although, I think, still in production for marine use) and the 567, 645 and 710-series locomotive engines, still being in production after nearly 70 years.

So we are left with the opposed piston engine. We have seen recently two configurations of two-stroke diesel engine proposed as alternative engines for light aircraft by two ex-colleagues, the Wilksch and the DAIR, the latter now developed into the HAE by Mike Howells. It might appear that the only thing to choose between them is the overall shape. On this basis there is no question that the opposed piston engine is a better fit into the engine bay of any aircraft that originally had a horizontally opposed engine, like the O-200, than the upright valve-in-head engine. But there is another, more technical point in favour of the opposed piston engine.

These engines, as aircraft engines, will be running not on normal diesel fuel but on jet-fuel (kerosene, that is). This brings to mind the multi-fuel engines referred to above, the Leyland L60 and the Rolls-Royce K60, which were developed to be capable of running on "wide-cut-gasoline", a type of petrol that was to have been the only fuel available in a combat zone. Before these engines were developed, the MOD tested a whole variety of diesel engines for their ability to run on petrol and the one that came out best was the Rootes TS3. It is my belief that this was because combustion took place between the hot crowns of the two pistons rather than having a cylinder head that was not far from the cooling water. These pistons are commonly oil-cooled, but the maximum crown temperature is probably limited by the temperature at the top piston ring. As with any piston, if the oil gets too hot at this point, it bakes and the top ring sticks in its groove.

Fuels for spark ignition engines and diesel engines require properties that are quite opposite to each other, as is indicated by the ratings used to describe them; *octane* number for petrol, which indicates its *resistance* to unwanted combustion due to high compression temperatures and hot spots, and *cetane* number for diesel fuel, which indicates its *readiness* to ignite due to compression temperature. Good modern fuels have cetane numbers from 50 to 55, whereas fuels in the 1930s, when the Junkers engines were used, were more like 40. I have never seen (although I might be out of date) a figure for cetane number of kerosene but I bet it is not very high because gas turbines don't care about either octane number or cetane number. *RP*

THE HAE 100 AERO ENGINE

... described by Cliff Mort

For the January Strut night we organised a visit to Mike Howell's factory where he is setting up a production line for the HAE 100 diesel engine. This was first designed by Diesel Air but nothing had really been done with it until Mike acquired the design. The one asset that Mike brings to the work is that he is a production engineer and consequently his approach to the engine is "how do I make it" and *not* "how much can I develop it".

Over 60 people gathered at the factory to hear all about it, and it was well worth the effort. I have to thank Mike and his son David for allowing us to visit the factory and the hospitality that they put on was superb. Bob Pick has given us the background and history of this type of engine and I will now try to follow this with a brief description of the HAE 100 itself.

This is a two-cylinder, two-stroke, diesel engine where the two pistons in each barrel come together in the middle and here fuel is injected to give the power. If you were flying behind one of these engines then the left hand crank is known as the exhaust, which means that the right hand crank is the inlet.

THE HAE 100 AERO ENGINE (Cont'd)

What I was not aware of was the fact that the exhaust side gives 75% of the power, leaving 25% for the inlet crank. I was also very surprised to hear that the pistons do not come together at the same time but are separated by about 14 degrees. The exhaust piston has a 7 degree lead whilst the inlet piston has 7 degree lag, making the 14 degrees in total. This is made possible by the fact that as the cranks go over top dead centre there is very little movement in the pistons and it can be considered as zero for those 7 degrees

To facilitate the gas flow and to purge the exhaust gases there is a supercharger incorporated into the engine. This runs at over 60,000 revs and generates one bar of pressure. In this department Mike identified a major problem in that the quill shaft, which runs the supercharger, was permanently connected and if one were to shut down the engine too quickly then the energy still in the rotor would just twist the shaft to breaking point. So, one of the first modifications was to incorporate a roller ramp clutch which allows for this overrun.

The barrels for this engine are very complicated and needed some interesting work to resolve the detail machining of them. However, if I were to describe the way it was accomplished you would be asleep in 5 seconds flat, so I'll give that a miss. Needless to say it was done and works.

Quite a few other production problems have been overcome and I foresee Mike getting into his stride in the very near future. This is not to say that the engine cannot be developed, for I am sure it can, but you have to finalise the design to a point and this has now been reached.

The engine itself runs at 3,200 rpm and it is a very simple conversion to let the propeller run at 2,500 revs. This is because the two crankshafts are geared together and it's a simple job to let the middle gear drive the prop. Starting with a swept volume capacity of 1,810 cc, the engine has now been run with a power output of 120 bhp but the best advantage over its nearest rivals, the Continental O-200 and the Lycoming O-235, is its fuel consumption. That for the O-200 is about 20 litres per hour and the O-235 approximately 25, whilst the HAE 100 is coming in at about 13 litres per hour. So we have an engine with 20% more power and yet it is 30-40% less thirsty - and all this is in the same package and weight of an O-200 itself.

Obviously only time will tell how it performs in the air but the one thing that we can say is that it is definitely more frugal than existing engines.

I suppose that we must remember that the original design of the Continental and the Lycoming commenced in the 1920s so they can hardly be said to be modern. We do see from time to time news reports that both companies are making 'new' engines but these are just variations on the old themes.

I do have to say that when I first saw the engine under the Diesel Air banner I was quite dismissive and thought it was not going to be something that I would want. But, after the presentation, I have seen something which is very useable and will be an asset to the world of aviation. It is almost like Paul on the road to Damascus - I have seen the light! I look forward to Mike getting this into an airframe as soon as possible for us to see the results of his work. If anyone wants to see more about the engine, look on the web site www.howells-aeroengines.co.uk. All the details are there for any aspiring owner. *CM*

SECURITY OF TENURE AT BARTON

The latest news

A meeting between representatives of Barton MFC and Barton Aerodrome Operations Ltd has confirmed the security of the Barton circles for the immediately foreseeable future.

Now that the Lancs Aero Club is no longer the leaseholder, Barton MFC has been offered a two year lease in its own name that includes an option upon expiry to renew for a further period. As always, these things will come at a price but it is understood that at least there will be no additional charge levied in respect of the existing container and caravan on site.

However, the position remains less clear with regard to any continuing use of the former Lancs Aero Club rooms, the building now having been taken over by *Ravenair*, who are in the process of renovating it. Discussions promised with their representative (based in Liverpool) have not yet been forthcoming.

At the moment, therefore, there is no access to the former clubhouse and accordingly, until further notice, monthly clubnights will become flying evenings only.

STUNT

A new fun-fly event?

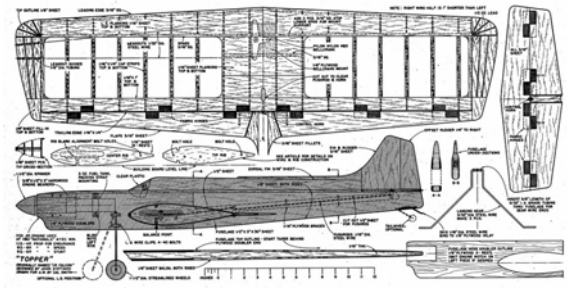
Some comments on the Barton Forum in favour of a sport-stunt event for "non-stunt flyers" led Nev Eyre to query the possibility of a one-model multi-disciplinary event (e.g. team-race/stunt/combat) that might appeal to ex-racers and combat flyers. *[The inclusion of 'combat' would make it a non-starter at Barton so perhaps 'speed' might be substituted? – Ed]*

The first response was from Ray Lloyd:

"A few years back when we started the Barton club, we had a good number of stunt flyers of varying ability from Beginner to Class 2 and better. Quite a few indicated that they would like to enter competitions but very few did. I wonder whether a club stunt/racing comp might be a good idea – this is not F2B or F2C but would be pure fun event for club members, combining a bit of everything. I have borrowed the following idea from the Nottingham club…

Distance to fly is 5 miles (so shorter lines will fly more laps); all models must have undercarriage and rise off ground; two pit stops must be made; three consecutive loops, one complete lap inverted below 45°,two bunts – all manoeuvres optional but two minutes to be added to time for each one missed; the model will be timed over all upright laps but not on inverted laps; each manoeuvre marked out of ten and score deducted from flying time; lowest number of points wins; no limit on engine or model size; squeeze bottle filling; one helper allowed but pilot must start his own engine." RL

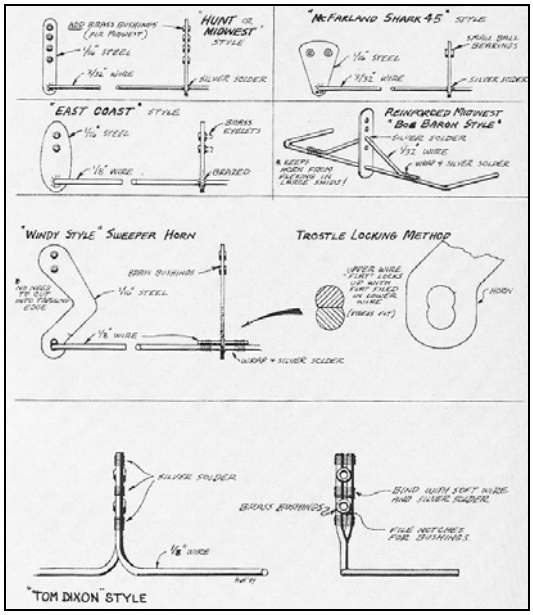
Barry Pickles also drew attention to the Wharfedale Triathlon event, now dormant for 10 years (but the Cup is still there and Barry would run the event again if any takers). Terry McDonald recalled Dave Clarkson's *Mini Slow* construction article (plus rules for an event not too dissimilar to Ray's proposal) in *The Control Line Aeromodeller Extra* published in the '70s. Before that too, there were "Jim Walker" multi-events in North America, such as the hobby-industry sponsored AYSC programme in the '60s. Your comments, please!

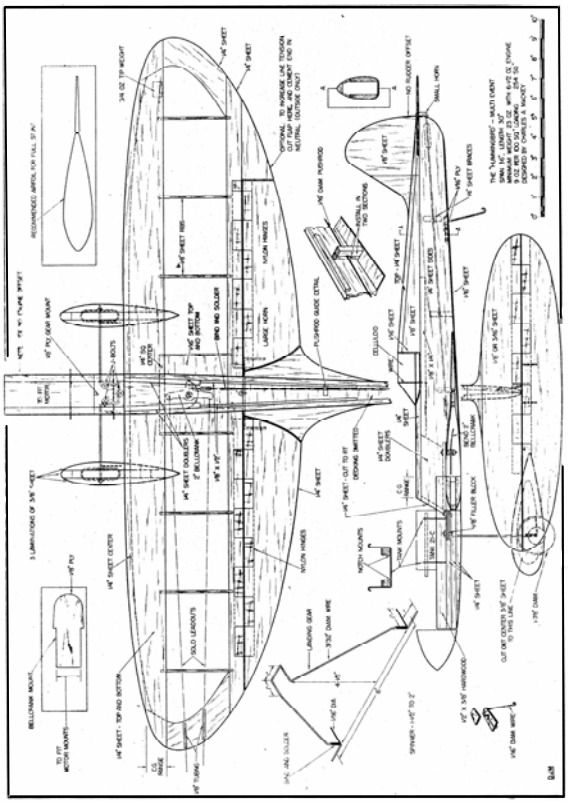


'Topper', 1961 AYSC winner (where it was also judged on appearance!) - too sophisticated for a simple fun-fly?

Horn variations

No, not more Mozart, Tabitha! They're sketches by Windy Urtnowski preserved from 20 years ago and depicting various styles of home-made flap/elevator horns. Underlining the need for sufficient stiffness in the horns to avoid control surface blow-back, he observed that a list of great "60" stunters that were competitive with rubbery controls was about as long as a list of WW1 helicopters!





Appealing Mackey-designed 'Hummingbird' for Fox 19 or Oliver Tiger was 1961 AYSC runner-up to 'Topper'.

WINGS OF PORTUGAL – *ÉVORA 2007*

This great event is on its way again!

With a 10 year history and now for the third year in Évora, **Wings of Portugal** will take place again from 7-9th September at Évora's aerodrome.

Control Line Events:

Handicap & Vintage Speed; Old Time & Classic Stunt; F2B; VTR; Barton B; Fox Racing; Quickie Rat; Clown Racing; Goodyear; F2C-N; Phantom Racing; Phantom Speed I & II. *[Also RC OT & F3J National]*

Wings of Portugal is a unique event, where we seek to promote sportsmanship and friendly competition. More important to us than the podium positions and prizes will be the presence of "nice people". Our main rule is: *NO PROTESTS ADMITTED!*

Some Stats:

Last year, we had 305 entries from aeromodellers from 12 countries (Portugal, Spain, UK, Ireland, Canada, Moldavia, Ukraine, Holland, USA, Australia, Italy and Brazil). Some of the participants came with their wives. We had a prize-giving ceremony with over 100 trophies. Many of those participating have been coming to this event since 1997.

We offer:

A bus on the day of arrival, 6th September, from Lisbon airport to Évora and return on the 10th; a daily bus from the accommodation to the flying site and return; accommodation and breakfast for participants who register before August 1st (after which we will do our best to find you a place); a banquet on the 8th for all participants and families with raffle and gifts; tourist trips for spouses. *ALL OF THIS IS FREE!*

Évora is a wonderful city of Portugal having origins in Roman times and culture. We invite you to make the trip to Évora to fly with **Wings of Portugal** for good fun, wonderful food, lots of sun and flying!

Julio Isidro, *President of SAM Portugal 74 (www.clportugal.com)*

[NOTE: Readers intending visiting this event are recommended to consult Brian Winstanley (01254 52196) for first hand advice – Ed]

EXACTLY 50 YEARS AGO!

From Model Airplane News, May 1957:

"American youth ***is*** *interested in flying models. The trade as a whole has not lost its way. Certain segments, however, do lack the foresight, imagination and creativeness to keep pace with the modern minds of our young people. The kids haven't lost interest in us – we've lost interest in them.*

"We believe that the building of flying models is on the threshold of a new age – an age that must be created by bold, years ahead, creative design. Is it wrong to use new materials? Is it wrong to prefabricate? Is it wrong to design items that stir the imagination of youngsters? Is it not fair to give a boy a reasonable chance at succeeding in his first try at flying models?

"There are new things in the wind, not a piece of balsa in them – I hear groans from the traditionalists! – but they will fly and fly well. Our American youth is living in an age of progress. If our young people are not interested in flying models, it is because the manufacturers are lagging behind in the development of modern kits. We praise and admire engine manufacturers for their forward thinking and amazing little power-plants. It is up to the kit manufacturers now.

"The threshold is here and there are people in the trade gambling that our young people do want flying models – not the traditional type but models with the element that is so lacking in present day kits. That element is creative design."

So wrote John Zawiski of the Hawk Model Co. and to which Editor Bill Winter added his typically reactionary footnote: *"Will the day come when cement and balsa, tissue and dope are completely by-passed? When ready to fly plastic stunt jobs for .29s and .35s take the air? When everything from sport free flights and flying scale models to RC ships come in panels and assemblies to glue together? One thing is for sure – without wood and cement it can't be model building."*

Prophetic - *or not?* However, as far as is known, the Hawk Model Co. of Chicago *didn't* survive as such and is no longer extant.

[I have a particular soft spot for the Hawk name because during the later war years I was the privileged recipient through the post of various Hawk solid kits – Thunderbolt, Corsair etc – obtained by my father on trips to the USA with the RAF. One box has miraculously survived and is still in use today for oddments. – Ed]

How excessive heat affects the human body If you are contemplating visiting Evora this summer – or even disporting yourself at Barton in the promised heat-wave – be aware that symptoms of heat exhaustion include mental confusion, headache and sometimes aggressive behaviour. Victims may seem drunk, suffer dizzy spells or faint as blood pressure falls due to dehydration.

SIGHTED QUITE RECENTLY AT BARTON

The Barton Club at prayer

In a move to allay fears of the effect upon our widespread membership of the possible loss of the Lancs Aero Club room, the Barton MFC has set up a series of occasional prayer meetings. The first of these was conducted from a makeshift pulpit by an invited preacher from the distant parish of Tewkesbury in front of an entranced congregation.

During prayers *[below]*, selected supplicants were permitted to approach and symbolically wash the feet of the visiting cleric, as demonstrated here by Mr. L. Morrall, Honorary Alms Collector of the parish, who also led the responses. Then, donning surgical gloves before meeting parishioners *[inset photo]*, our guest chose as his theme the popular tract: "Let he among you who hath eaten the last pork scratching be cast into the wilderness."

What's that? Oh, no! It seems it's *the* Martin Worgan (who travelled all the way up from Gloucestershire to stand in at short notice for the indisposed Mike North) seen at the March club meeting demonstrating the techniques of pressed resin wing finishing before enthralled club members. Verily, an entertaining and instructional evening for all!

Two years on

Beginning to look nice in the sunshine, the memorial garden dedicated to old friends *[right]* has benefited from some mild spring weather prior to the BASH.

Earthworks, earthworks...

It's Friday *[below]* and now only nine weeks to go...

All photos on this page by Fred Hall

The line park

Needed for the BASH, but unfinished *[right]* with only three weeks to go...

Left to right: John Bradley, Brian Winstanley, John Broadhead, Malcolm Ross

Body language

tells its own story *[above]*. Only 14 days left until the BASH but getting on...

The gang master

At the April Goodyear races, Brian Winstanley *[right]* samples the still to be completed facilities.

NOTICE
Flying site improvements

The Barton MFC Committee intend to apply for grants to finance improvements to the flying site facilities. There is no shortage of ideas as to what we would like to have but, before we submit any proposal to the grant authorities, we would welcome suggestions from both club members and visitors as to what improvements they would like to see at the site.

John Kergon, Chairman

BARTON CIRCLES 2007
COMPLETE
CALENDAR OF EVENTS

(All on Sundays except as noted)

3 June
BGY & OGY
Contact: Tony Eifflaender 01625 616054

8 July
BGY & MGY
Contact: Tony Eifflaender 01625 616054

5 August
BGY & MGY
Contact: Tony Eifflaender 01625 616054

16 September
F2B (Barton Cup)
Contact: Ray Lloyd 01706 212184

23 September
BMFA Centralised F2C, F2B & Class 2
Contact: Chris Barker 01420 543905

30 September
BGY 1000 Laps
Contact: Tony Eifflaender 01625 616054

7 October
BMFA Centralised F2 A, F2B & Class 2
Contact: Jo Halman 01582 424398

14 October
BGY & OGY
Contact: Tony Eifflaender 01625 616054

28 December (Fri)
Cold Turkey Day BGY,MGY, Barton B
Contact: Malcolm Ross 01925 766610

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Safety Officer/Web Site Administrator:
Jim Hatch *Tel: 0125 470 8415*

Club Photographer:
Fred Hall *Tel: 0161 748 4391*

Essential Do and Don'ts!

Carry your Barton membership card at all times when on site.

Lock the gate after yourself on entry and exit:
DO NOT leave the lock set to the combination
OR divulge the gate code to any non-member.

Flag: *Put up the flag BEFORE you fly.*
Take it down BEFORE you leave!

Airstrip: *DO NOT CROSS THE RUNWAYS or enter active areas without express permission from Barton Tower at any time when the airfield is operational.*

Police helicopter: *Land or fly low WHENEVER the police helicopter is operating nearby.*

Report all emergencies to the Barton Tower:
Telephone: 0161 787 7326

First aid kit: *Always kept in the container.*

Mower & dumper: *DO NOT OPERATE either machine without prior instruction AND clearance from a Committee member.*

Leave no litter: *TAKE IT HOME WITH YOU!*

Check the weather: *Dress appropriately.*
(48 hr forecast for M30 at www.metcheck.com)