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THE VOICE OF CONTROL LINE  
AEROMODELLERS FROM  
AROUND AUSTRALIA

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Number 110



Produced by the Victorian Control Line Advisory Committee

May 2007

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**Copy Deadline for next issue is:  
Wednesday May 16th 2007  
PRODUCTION SPECIFICATIONS**

Please remember when submitting copy that if you have access to a PC, or suitable typewriter you can save me retyping by giving me your items pretyped, and please use a good black ribbon for best reproduction. **Best of all is to send it on a 3.5" disk as a Windows Write, Word for Windows, or as an ASCII TEXT FILE or use Email**

Contest results should be tab delimited, ie use a single tab between each column of results, if submitted by disk or email. This makes formatting much easier on the editor.

Email address:- [hbbailey@optusnet.com.au](mailto:hbbailey@optusnet.com.au)



## COMING EVENTS



## COMING EVENTS



### VICTORIAN CONTROL LINE CONTEST CALENDAR 2006/2007

MAY 27	<b>FAI &amp; Combined Speed, Mini G/Y (State Champs), FAI &amp; modified Combat.</b>	
	1/2A Combat	CLAMF
MAY 27	<del>Cancelled</del> Classic Stunt Competition	KMAC
JUNE 17	1/2A and Vintage Combat	
	10a.m. start Brimbank Falcons	
JUNE 24	(up to) 2.5cc Day	KMAC
JUNE 24	<b>FAI &amp; Combined Speed,</b>	
	Vintage Stunt	CLAMF
JULY 8	<b>FAI Team Race, Goodyear T/R,</b>	
	Mini G/Y, Ballon Burst, Limbo.	CLAMF
JULY 22	Yeoman Trophy F2B Stunt Competition	
		KMAC
AUG 12	<b>FAI and Combined Speed,</b>	
	Classic Stunt,	
	Sport Flying.	CLAMF
SEPT 9	<b>FAI &amp; Combined Speed,</b>	
	Vintage Combat, Carrier Deck,	
	Sport Flying,	CLAMF
OCT 14	Classic B, Vintage A,	
	Sport Flying, 1/2A Combat.	CLAMF
NOV 11	<b>FAI &amp; combined Speed, Simple Rat,</b>	
	Aussie A T/R,	
	Triathlon, Sport Flying.	CLAMF
DEC 9	<b>FAI Team Race, Goodyear,</b>	
	Mini G/Y, <b>FAI &amp; combined Speed,</b>	CLAMF

Events will be flown in order of printing.

Events in **Bold type** will be flown over hard surface

**CLAMF** Frankston Flying Field, Wells Rd, Seaford (Melway 97J10), 10.00am start

Contact :- G. Wilson (03) 9786 8153,

[CLAMF@ozemail.com.au](mailto:CLAMF@ozemail.com.au)

**KMAC** Stud Rd. Knoxfield (opposite Caribbean Gardens) (Melway 72 K9) 10.00am start

Contact :- Peter O'Keeffe (03) 9753 3442

[kmac@aanet.com.au](mailto:kmac@aanet.com.au)

**Please note that for 2007, the KMAC club has decided that all events on the fourth Sunday of each month will be organised and hosted by KMAC only - no other clubs are involved in running events on the same day at the KMAC flying field.**

**CLAG** Contact :- Graham Keene (03) 51924485

Details of venues can be found on web site

[www.clagonline.org.au/home.htm](http://www.clagonline.org.au/home.htm)

**Brimbank Falcons** Stadium Drive, Keilor Park Recreation Reserve, Keilor. (Melways ref 15 C 5). Regular flying day 3rd Sunday of each month 10.30am.

Contact Ken Maier 03 9398 8244 [combtkid@hotmail.com](mailto:combtkid@hotmail.com)

## CLASII CALENDAR 2006/2007

Flying has continued on Saturdays at the Leichhardt Park flying site ( UBD Map 232 R1)

John D. Taylor,  
Secretary/Treasurer CLASII (Ipswich, Queensland)  
Phone (07) 33927679  
Email [johndt@iprimus.com.au](mailto:johndt@iprimus.com.au)

### C.L.A.S. (NEW SOUTH WALES) CONTEST CALENDAR 2006

DATE	CLUB	EVENT
May 19/20	MDMAS. (Mitchell Hill Fields Muswellbrook)	VETERANS' GATHERING
May 27	SSME	F2B Aerobatics
Jun 3	KMFC	Palmer/Aldrich Classic Stunt and CLUB STUNT (Novice)
Jun 9,10,11	CLAS. NSW C/L STATE CHAMPIONSHIPS	CLAS. Whalan Reserve & Luddenham.
Jul 8	KMFC AGM,	2.5 Stunt, Club Racing and Slow Combat
Aug 5	KMFC	F2B Aerobatics and Novice Stunt.
Aug 11	KMFC	CLUB STUNT (Novice)
Aug 26	SSME	Slow Combat (Bonus points for WW2 Style model).
Sep 9	KMFC	Classic Stunt, Vintage Stunt, Club Racing, Slow Combat, SWAP MEET
Sep 29-30	CLAS State Championships	F2A & F2C @ Hard Surface on the Twin Cities MAC field, Albury. NSW.
Sep 29	KMFC	CLUB STUNT (Novice)
Sep 30	SSME	F2B Aerobatics
Oct 14	KMFC	Gordon Burford Day, Club Racing
Oct 28	SSME	Phantom, Vintage A, Bendix T/R, Vintage 1/2A
Nov 3	KMFC	CLUB STUNT (Novice)
Nov 4	SAT (Kelso Park)	F2B Aerobatics
Nov 11	KMFC	Vintage T/R, 1/2 A, A and B.
Nov 18	NACA (Gateshead H.S.)	Classic Stunt & Cardinal Stunt. (I. Smith Ph:024975 2292)
Nov 25	KMFC	1.6 and Slow Combat, Club Racing
Dec 2	Doonside. Venue TBA	F2B Aerobatics
Dec 9	KMFC	Christmas Party and Fun Fly
Jan.2008	CLAS. (Details to be advised)	CLAS. CITY OF SYDNEY CHAMPIONSHIPS
DOONSIDE - (Doonside Model Flying Club) - Kelso Park North, Panania.		
KMFC - (Ku-ring-gai Model Flying Club) - St. Ives Showground, Mona Vale Rd, St. Ives.		NACA - (Northern Area Contest Aeromodellers) - Gateshead H.S., Pacific Hwy, Gateshead.
REMAC - (Ryde Epping Model Aero Club) - Peter Board HS, Wicks Rd, North Ryde.		SAT- (Sydney Aeromodelling Team) - Kelso Park North, Henry Lawson Dr. Panania.
SSME - (Sydney Society of Model Engineers) - Model Park, Luddenham Rd, Luddenham.		WMFC -

(Werrington Model Flying Club) - Entrance to flying site @cnr. Landers & Walker Sts, Werrington.

MDMAS - (Muswellbrook District Model Aero Sports Inc.) - Mitchell Hill Field, New England Hwy, Muswellbrook

COMSOA - (City of Maitland Society of Aeromodellers) Raymond Terrace Rd, Metford.



## Adelaide Aeromodellers Club

### 2007 Events Calendar

May 5 Peacemaker / FliteStreak Stunt #1  
 July 7 Slow Combat # 1 and Balloon Burst  
 Sept 1 Triathlon  
 Oct 6 Slow Combat # 2 and Balloon Burst  
 Dec 1 Peacemaker / FliteStreak Stunt # 2

#### Notes:

1. All days are Saturdays, dates are provisional
2. Start time of all competitions is 11.00 am. Practice from 10.00am  
(Note there will **no** be late starts during daylight saving)
3. All events to be held at the AAC field, Unley Rd City opposite BMX Park
4. All entrants must be MASA members and show their FAI licence
5. Safety straps required on all handles in all events.
6. Mufflers mandatory on all glow motors 2.5cc and above
7. No Carrier competition until some one organises a deck! (Any volunteers?)

**For more info contact Peter Anglberger,  
 tel 8264 4516**

### Western Australia 2007 Control Line Calendar

Date	Club	Event
May 5 1pm	Lumen Christi?	Vintage Combat
May 19 2pm	CLAW	CLAW race day F2C & F2F
<b>May 26 1pm</b>	<b>Lumen Christi</b>	<b>F2B Aerobatics</b>
Jun 9 2pm	CLAW	CLAW race day F2C & F2F
<b>Jun 30 10am</b>	<b>CLAW</b>	<b>F2C rnd 1,2,3. F2F</b>
<b>Jul 1 10am</b>	<b>CLAW</b>	<b>F2C rnd 4 &amp; final, Vintage A</b>
Jul 14 1pm	Lumen Christi	Vintage Stunt
Jul 22 2pm	CLAW	CLAW race day F2C & F2F
Aug 12 2pm	CLAW	CLAW race day F2C & F2F
Sep 1 12pm	Lumen Christi	The Tarmac Day
<b>Sep 8 11am</b>	<b>CLAW</b>	<b>Vintage Combat</b>
Sep 16 2pm	CLAW	CLAW race day F2C & F2F
Oct 13 2pm	CLAW	CLAW race day F2C & F2F
<b>Oct 27 1pm</b>	<b>CLAW</b>	<b>Open Combat</b>
Nov 10 2pm	CLAW	CLAW race day F2C & F2F
<b>Nov 25 10am</b>	<b>CLAW</b>	<b>Combined Speed</b>

Events listed in normal type are Club events.

Events listed in **bold** type are State events.

Contact Trevor Letchford for further information.

ph - 089 342 2625 mob - 0439 956 846

The views and opinions expressed in ACLN do not necessarily reflect those of the Editor or Committees of Clubs or of the members of the Club represented in ACLN but are those of the respective authors.

Any comments, queries or complaints with respect to any article in this publication should be addressed to the author of the article.

The Editor and Committee of Clubs accept no responsibility or liability for any loss or damage incurred or suffered by anyone as a result of this publication or in reliance upon or as a result of acting upon anything contained in this publication.

#### Newsletter Editor

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**37 Thompson Street**  
**Clayton 3168**  
**Victoria**  
**Tel (03) 9543 2259**

### Notice.

#### Information from the Control Line Advisory Committee

This Committee have become aware that the content of the stunt report for the 2006-7 Albury Nationals, as printed in the ACLN Issue No 107 February 2007, may have offended some individuals.

The Editor of the ACLN endeavors to ensure this situation should not arise.

Reports and articles for inclusion in the ACLN are received in good faith, on the basis of being written by an authoritative source, the articles and reports are then printed in the ACLN in good faith.

If, however something printed in the ACLN has caused offence, or is believed to have cast aspersions on the good character of an individual or individuals, the Control Line Advisory Committee sincerely regret that this may have occurred.

#### 2006/7 QLD State Championships Timetable

With only about 30% of those entries usually received by the closing date for entries, it is not possible at this time to offer anymore than a tentative programme.

Sat 5/5/07 : Junior and F2D Combat  
 Sun 5/6/07 : Open and .35 Slow Combat  
 Mon 7/5/07 : 2.5cc Slow Combat  
 Sat 12/5/07 : F2B Aerobatics  
 Sun 13/5/07 : Any Rat, Mouse or Team Races

Obviously earlier statements by those in "Authority" who didn't bother to contact anyone in the club that has been responsible for at least 10 out of 11 State Champ's has had a devastating effect (and also become a self full filling prophecy.)

Brian Burke AUS 2738 A.L.C Com. Sec.

# 2007 SA State Control Line Champs Stunt Report

## Monarto and Echunga, March 10<sup>th</sup> to 12<sup>th</sup>

The weather on the Adelaide Cup weekend unfortunately adversely affected this year's competition. Practice Day Friday and Saturday was fine but hot conditions. It was encouraging to see a high percentage entries were local fliers entered. A large NSW contingent were present as placing counted for Landres 2008 World Champs team selection.

### F2B

Contestants revelled in the Saturday's Round 1 conditions, except Dave Simons who must have suffered heat stress as he flew 4 inside loops and Leon Baird, who took too much fuel out of his tank and missed the last 3 manoeuvres. He slightly damaged the model on inverted landing after the motor cut prematurely. Murray Howell and Joe Parisi both flew neat patterns and Mark Ellins made his usual dash from the racing circle to put in a steady flight.

It was shaping up to be an interesting contest but the elements had other ideas. Round 2 on Sunday morning was at first beset by squally showers. The CD delayed the start until the weather cleared. However as the showers passed the wind strength increased to just on the 9 m/s limit in gusts. It was decided to delay Round 2 until Monday in the hope the wind would abate overnight.

Monday saw the contest move to the Adelaide Hills town of Echunga. This was supposed to be gala CL day with F2B, Classic Stunt

Vintage Combat and F2D events flown at the town oval. The despite 'fine' weather, the oval was affected by severe turbulence and wind was measured up to 11 m/s. After some time the CD made the decision that the conditions were unlikely to improve enough to fly. Rounds 2 and 3 were therefore cancelled due to the wind speed being measured at greater than 9 m/s for more than 30 seconds as per FAI rules. The final score is therefore not averaged over 3 rounds.

Place	Entrant	Round 1	Round 2	Round 3	Final Score	Model	Motor
1	M. Howell (NSW)	975	x	x	975	Yatsenko Shark	Retro Disc 61
2	J. Parisi (Qld)	956	x	x	956	OD	Saito 72
3	M. Ellins (Vic)	906.5	x	x	906.5	Jazzier	Stalker 61
4	F. Battam (NSW)	896	x	x	896	Yatsenko Acrobat	Retro Disc 61
5	D. Simons (NSW)	881.5	x	x	881.5	Yatsenko Acrobat	Retro Disc 61
6	P. Anglberger (SA)	759	x	x	759	Focke Wulf	ST 46
7	L. Baird (SA)	689.5	x	x	689.5	Classic Yardstick	Enya CX 21 D
8	B. Swan (NSW)	599	x	x	599	Mongrel	ST 46
9	G. Roadknight (SA)	585	x	x	585	Prowler (OD)	Enya 45 6001

CD: Peter Anglberger

Judge: Russell Bond

### Novice Stunt Saturday March 10<sup>th</sup>

Four keen local novice flyers enjoyed good conditions although the changeable moderate breeze did occasionally affect some entrants' maneuvers.

All four flyers 'had a ball' and benefited from contest experience and exposure to expert level flying when watching the F2B competition. Thanks to all entrants for attending as this is the first time in many years that a Novice event has been run at the SA State Champs and bodes well for the future.



*M. Howell (NSW) with his winning F2B model*

### Novice Stunt results.

Place	Entrant	Round 1	Round 2	Best	Model	Motor
1	M Dyer (SA)	671	740	740	Own Design	OS 25 LA
2	M. Davies (SA)	631.5	718	718	Maxi Slow	ASP 15

3	J. Witzke (SA)	623	646	646	Tutor ARF	OS46 LA S
4	A. Roadknight (SA)	533	590.5	590.5	Thunderbird Mk2	OS40LA S

CD: Peter Anglberger Judges: Peter Anglberger & Greg Roadknight

Special Thanks to Adelaide Model Aerosport members and helpers for cooking the BBQ lunches, preparing the field, and hosting the events. Thanks to the judges and all AAC members who helped run the Stunt events.

## **AAC Unley Rd City, March 24<sup>th</sup>**

Vintage and Classic Stunt scheduled at Monarto and Echunga respectively suffered the same fate as F2B Rounds 2 and 3, but rather cancel the events entirely it was decided to postpone the events 2 weeks.

### **Vintage Stunt:**

A simplified static scoring system was employed based on the MAAA rules, as time was rather short.

The wind caused a few headaches at times but the only serious incident was when John Witzke's FliteStreak ARF was blown down at the bottom of an outside loop, effectively writing off the model. Maris Dislers improved his round 1 score by 13 points in Round 2 to win the contest. Peter Anglberger could not make use of the relatively good air in his second round and was one point behind in second place. Brothers Greg and Alan Roadknight fought a close tussle for 3<sup>rd</sup> place. Alan flew his 'All American' extremely well in Round 2 and was unfortunate to just miss 3<sup>rd</sup> place. Mal Dyer's second flight was affected by a loose comp screw and overran by 4 minutes after which he was heard to mutter something uncomplimentary about old diesels.

Place	Entrant	Static	Round 1	Round 2	Static + Best Flight	Model	Motor
1.	Maris Dislers	39	147	160	199	Peacemaker (1958)	AM 25 (1955)
2.	Peter Anglberger	28	170	167	198	Squaw (1951)	Fox 35 (1958)
3.	Greg Roadknight	17	158	163	180	FliteStreak (1958)	OS Max 20
4.	Alan Roadknight	22	142	155	177	All American(1951)	OS FP 35
5.	Mal Dyer	31	142	84	173	FliteStreak (1958)	ED Hunter(1954)
6.	John Witzke	17	129	72	146	FliteStreak (1958)	OS Max 25

### **Classic Stunt:**

Classic was run to MAAA rule except that models up to January 1<sup>st</sup> 1970 are eligible. Stronger wind made flying interesting at times. Peter Anglberger managed to cling onto first place just 6 points in front of Greg Roadknight despite scoring zero for his three vintage ( i.e. not FAI as per the rules) Vertical 8s. Only one round was flown due to the wind. Alan Roadknight finally and deservedly picked up a trophy flying to 3<sup>rd</sup> place.

Place	Entrant	Score	Model	Motor
1.	Peter Anglberger	455	Gieseke Nobler	L&J Fox 35
2.	Greg Roadknight	449	FliteStreak	OS Max 20
3.	Alan Roadknight	339	Thunderbird Mk2	OS LA 40S

CD: Peter Anglberger Judge: Bob Edgecombe Vintage Static Judge: Bernie Shinks

Thanks to Ann and Jo Roadknight for their catering effort and all AAC members who helped on the day.

## **Adelaide Aeromodellers Vintage & Classic Stunt, February 24th 2007**

### **Vintage Stunt:**

To save time the AAC 'simplified' static scoring was employed, the judge awarding points for age of model and motor as well as bonus points for fixed flaps and 2.5 cc motors or less.

Place	Entrant	Static	Round 1	Round 2	Score	Model	Motor
1	P. Anglberger	31	160.5	175	206	Squaw (1951)	Fox 35 50th Anniv
2	M. Dyer	33	138	159	192	FliteStreak (1958)	ED Hunter (1954)
3	G. Roadknight	19	159	160.5	179.5	FliteStreak (1958)	OS Max 25 (1968?)
4	A. Roadknight	28	151	136	179	All American (1948)	OS FP 35 (1982?)
5	C. Carpenter	19	145.5	114	164.5	Peacemaker (1958)	Taipan Series 71 D
6	J. Witzke	0	34	163.5	163.5	Tutor ARF	OS LA 46 S (1992?)
7	B. Edgecombe	19	69.5	137.5	156.5	FliteStreak (1958)	Enya SS25D



Although breezy, most competitors' models handled the conditions well. Bob Edgecombe crashed in round 1 due to an under compressed setting, but sustained only minor damage and was able to fly round 2. Chris Carpenter flew well in Round, 1 but suffered increased wind strength in Round 2. Alan Roadknight flew a personal best to finish just ½ a point behind older brother Greg. Mal Dyer's ED Hunter runs superbly now that he has added some DII to his fuel. John Witzke flew an excellent pattern and when he builds a pukka Vintage model, will start placing in contests.

### Classic Stunt:

Place Entrant	Round 1	Round 2	Best of 2	Model	Motor
1 P. Anglberger	506	0	506	Gieseke Nobler	L&J Fox 35
2 G. Roadknight	437	0	437	FliteStreak	OS Max 25
3 M. Dyer	385	0	385 (Novice Pattern)	Own Design	OS LA 25
4 A. Roadknight	371	0	371 (Novice Pattern)	Thunderbird Mk2	OS LA40S

Classic Stunt suffered a little from a stiffening breeze and the dreaded Unley Rd turbulence. Peter Anglberger's Nobler now with a reworked Larry Foster (USA) Fox 35 handled the wind well. Most thought it was either an OS LA or a Max. These are great motors and will 4-2-4 really well. They also have more power and do not vibrate like a stock Fox 35. Contact Peter for more info if you are looking for a good new 'classic' motor as these are less than \$200 incl postage, but no muffler, from Larry. Mal Dyer and Alan Roadknight elected to fly the Novice pattern as practice for the State Champs. Both flew well in trying conditions.

All Classic flyers decided to forgo flying round 2 as by 4.30pm wind had really picked up, saving their models for the SA State Champs 3 weeks later.

## F2B X-wing: the Ultimate failure of the HoG line-tension saga

Loyal readers who have been following the HoG (Heart of Gold) saga may recall that I have been trying at attain good line tension at 50 MPH. Line rake, offset thrust-line and radical engine offset have all failed to provide the line tension I need for solid overheads.

The only variable remaining is fuselage lift. Having no fuselage, the HoG would be at a disadvantage if fuselage lift were a necessity for good line tension. The flight of many models, such as in F3D and F2A, includes knife-edge flight: in these instances, the lift supporting the weight of the model must come from the fuselage, plus a small component due to engine inclination.

To test this hypothesis, I fitted the HoG with centre-mounted stub X-wings. Incidence was made variable by mounting the stub wings on a steel shaft. Hopefully, this adjustment would enable me to adjust line tension to values providing solid tension in overheads. These mods are clearly shown in the photos

Test flying provided the following facts:

1. Line tension in overheads was not noticeably increased.
2. Drag from the stub wings was high, making it impossible to glide the final lap, as required in the F2B pattern.
3. Increasing incidence only increased the drag.



I am forced to conclude that line rake, thrust-line offset, engine offset and X-wings fail to provide solid, reliable tension in overhead manoeuvres on stunters.

The certain methods are to reduce model weight and fly fast (like 5 second laps).

Methods involving rolling motions, such as tip, weight, differential wingspan and differential flaps can increase tension, but at the expense of wobbly square turns. Motor set-ups (2-4 break) that increase speed during manoeuvres are also effective, at the expense of fast reflexes in the pilot (read "youthful pilot")

All very sad. Anybody out there got a solution?

Cheers. Supercool

# The Cyclon JAK 09 Glowplug Engine

By Maris Dislers

## A versatile design

The Cyclon JAK 09 diesel engine was the subject of an earlier test report and proved to be the most powerful 1.5cc diesel engine that we have tested. This engine was also supplied with an alternative head that accepts a Nelson glowplug. It was a simple task to switch heads for an instant conversion to glow power. Aero versions of model car engines aside, there are very few high performance glowplug engines available around 1.5cc. Even if engine weight was not a consideration, Half-A combat has a limit of 0.1 cu. in., which eliminates this group of engines for our purposes. So the prospect of a hot performing glow engine is welcome news for all those who prefer them to diesels. How does the JAK 09 glow perform and is it a match for the exceptional performance of the diesel version?

## Performance tests

With no instruction as to fuel type, we assumed that F2D fuel with 10% nitro methane content might have been intended. Operation in glowplug mode was very straightforward, as starting was easier than the diesel, especially from cold. Even when hot, the JAK 09 glow was a one choke, one flick starter. We found the engine to be quite insensitive to mixture control. Unlike the diesel (which would descend into stuttering misfire if adjusted too lean) the glow engine merely sagged a bit. Once peaked out, it took quite a bit of richening of mixture to knock it out of a clean two-cycle run. Again, the tachometer was useful for seeking out peak running speed.

There was no tendency towards pre-ignition or other nastiness, even with a tiny Cox 6x3 prop. The Nelson plug survived the test session unscathed.

Performance tests were conducted with the custom venturi (see the diesel engine test report) at 2.5mm and 3.5mm choke diameters. Half-A combat mandates suction fuel feed. However, Alexander Kalmykov advises that they fly the JAK glow engines without the venturi insert (and bladder fuel feed?) for combat use. We ran a third series of tests in this configuration.

## Results

Glowplug engines have traditionally delivered lower torque than their diesel counterparts. However, the JAK 09 glow was right up there at 19 oz-in. However, this could not be maintained on the small venturi size and performance dropped quite sharply at higher speeds. Never the less, 0.33 BHP at 18,000 RPM is a commendable figure. Noise levels with the muffled engine were 95 dBA with Kavan 7x4 nylon prop (16700 RPM) and 101 dBA with the Seryogin prop (20,600 RPM).

As expected, increasing the venturi size to 3.5mm diameter was the tonic that the engine needed. Good torque was sustained further up the scale, resulting in a higher peak power figure of 0.37 BHP at a little over 21,000 RPM.

By removing the venturi insert, the effective restriction to admitting fuel/air is no longer the venturi, but the crankcase intake window. Its area equates to the equivalent of a whopping 7mm diameter carburettor throat. The effect on performance was a jump to 0.43 BHP at 23,000 RPM.

## Conclusions

It is seldom possible to assess an engine design both in diesel and glowplug form. Our testing showed the glow engine's manners and performance "out of the box" are a little better than the diesel's, but not by much. It is a little easier to start and is more tolerant of mixture variation, which might be a real plus when actually pulling a combat model around. For those people who want solid performance without delving into the workings of an engine, the JAK 09 in either diesel or glow form, with Kavan nylon 7x4 prop will do it. Drilling the venturi out to 3mm bore is a safe bet for a bit more performance. We recorded only 300 RPM increase on larger venturi sizes when using Kavan prop on the glow engine. However in-flight RPM when the engine "unloads" with a larger venturi can be expected to be significantly more than standard. Incidentally, the current crop of Kavan 7x4 props has one significantly thicker blade, which upsets balance. The simple solution is to trim this blade in diameter to achieve balance, rather than trying to thin the profile.

For those interested in getting extra performance, there appears to be more scope. On a size for size basis, the 2.5cc Star combat diesel delivers 15% more power than the JAK diesel and the Cyclon PC6 F2D engine gives around 20% more power than a comparable JAK glow set-up. Alexander suggests increasing intake timing a little to gain more power. The glow version would surely respond to more nitromethane in the fuel and optimisation of compression ratio with moderately nitrated fuels should give a boost. Finally, it might be worth raising the cylinder to increase transfer and exhaust port duration for high-speed work. In any case, the Cyclon JAK is a worthy of discriminating attention.

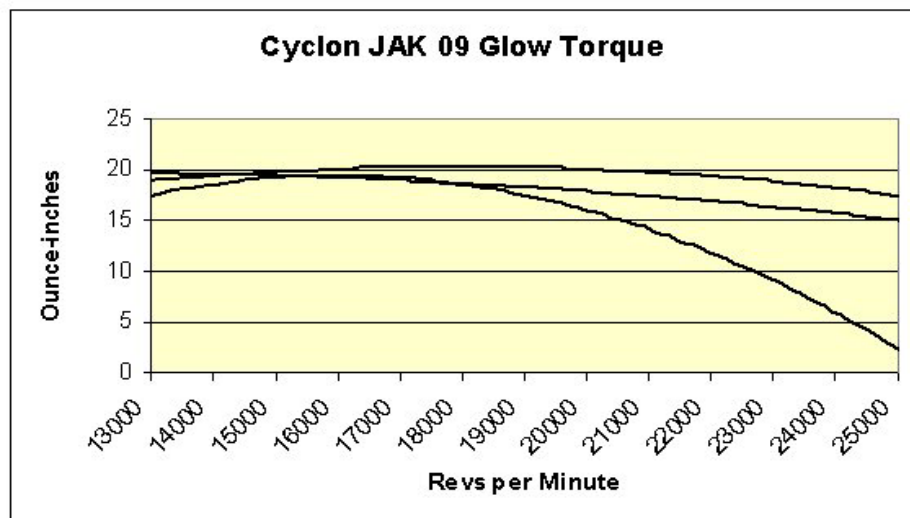
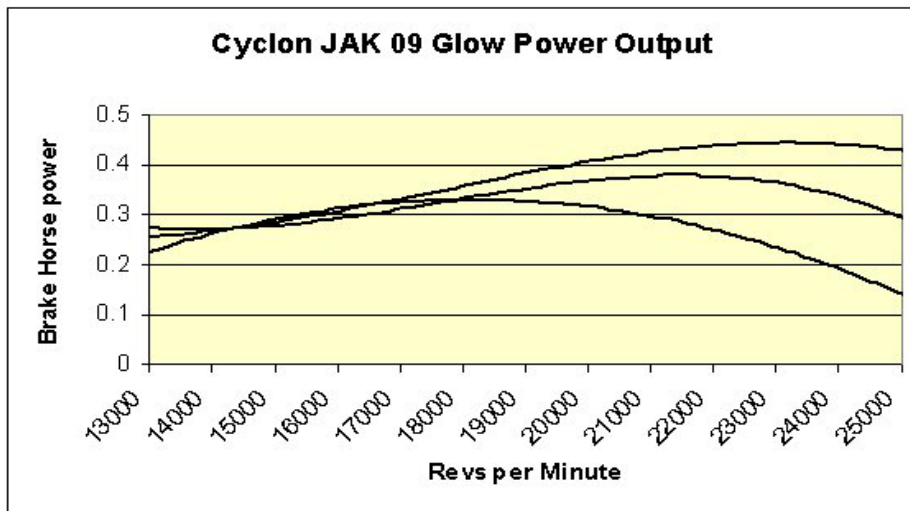
# JAK 09 Glow Test Results

Using F2D fuel 10% nitro

	Test 6	with muffler & my venturi (2.7mm) as glow	
APC 8x4	13100	0.227	17.5
Cox 8x4	12900	0.219	17.1
APC 7x6	13400	0.246	18.5
APC 7x4	17100	0.322	19.0
Cox 7x3.5	17500	0.305	17.6
APC 7x4T	18400	0.35	19.2
APC 7x3	19800	0.34	17.3
APC 7x3T	20800	0.285	13.8
Seryogin F2D	20600		0.0
Kavan 7x4	16700		

Test 7	Glow (F2D fuel)		
My venturi at 3.5mm bore			
APC 8x4	13800	0.265	19.4
Cox 8x4	13600	0.257	19.0
APC 7x6	14300	0.299	21.1
APC 7x4	16800	0.305	18.3
Cox 7x3.5	17200	0.29	17.0
APC 7x4T	18800	0.375	20.1
APC 7x3	20200	0.361	18.0
APC 7x3T	23000	0.365	16.0
Seryogin F2D	22400		
Cox 6x3	22700	0.325	
Kavan 7x4	17000		

Test 8	Glow (F2D fuel)		
No Venturi			
APC 8x4	13600	0.254	18.8
Cox 8x4	13400	0.246	18.5
APC 7x6	14700	0.324	22.2
APC 7x4	17100	0.322	19.0
Cox 7x3.5	17700	0.316	18.0
APC 7x4T	19300	0.415	21.7
APC 7x3	21500	0.435	20.4
APC 7x3T	25100	0.425	17.1
Seryogin F2D			
Cox 6x3	24900	0.429	17.4
Kavan 7x4	17000		



## A & B Team Race at the '07 Victorian State Champs.

Super Sunday on the Easter weekend dawned to near perfect weather. Unfortunately for quite a few contestants it was more like U2's 'Sunday, Bloody Sunday'... The KMAC field had not been mowed so an hour was lost as teams of contestants took turns to push the mower and rake the grass. It is not unreasonable to expect earlier preparation of the host site on the day of a State Championship with many interstate visitors. There were repercussions to this delayed start later in the day.

With the grass finally smoothed and practice flights completed, the action in VINTAGE A was fast and furious among the ten teams entered. Graeme Wilson and superflick Mark Ellins set the ball rolling with a smokin' sub 3.20 time in the first round.

Richard Justic and Andy Kerr had done little preparation prior to this meet and were relying on their combined modelling experience which must be around 70 years...:) It worked, as they scraped into the final by less than a heartbeat... 27 /100ths of a second!



The unlucky ones that just missed out were the Cosmic Rays. Back in business in Vintage A now they at last have an R250, they were faster than ever before and posted a PB time of 3.28.90. Now that Colin and Jim have IPN, it seems the sky is the limit. Jim says changing to IPN from DII made a huge difference to his Rothwell with noticeably more speed and laps.

Nats champs Rob Fitzgerald and Paul Stein were always going to take some tossing. After a first round to sort out settings, they were really honking in round two and with greased lightning stops recorded a super slick FTD of 3.17.13.

Harry Bailey and Peter Roberts were using a CS which, although it went well, it was out of its depth against a gaggle of seven high performing R250's. Was great to see Harry's smiling face. He was once again among his Victorian mates. We all know he was only pretending to be a Queenslander!

Record breakers Hugh Simons and Grant Potter had a really bad day. Right from their first practice the engine was sounding off tune. It wasn't until later that night that Grant discovered what had really happened... loose head bolts had allowed the liner to rotate! Good night nurse.

Hallowell/Baddock struggled with firstly a broken vent pipe and then to tune to the right setting. It didn't happen with lean runs reflecting in slow times. A chance of making the top 3 was there as the Dimpled Dumpling had been timed at 19.3/10 for 50 laps in practice the week before.

Murray Wilson and Lance Smith also had a forgettable morning after strong performances in last week's practice. A good tune proved elusive on the day.

Was good to again see the living legends in action again. The brothers Hunting were back in the thick of things and obviously enjoying themselves. It was like turning back the clock to the seventies when John and Ken first appeared on the team race scene... Despite the fun factor, the airspeed bogeyman was ever present and they again found out that times of just under four minutes doesn't cut the mustard anymore.

Neil 'Ledge' Baker and his mate Greg Pretty were flying the Ray Harvey (where was Ray?) built Olympian. It was just a lack of practice time and the usual sorting that stood in the way of these two challenging the front runners.

The final promised to be close and didn't disappoint. It was the F/S R250 Dimpled Dumpling vs the W/E R250 Olympian vs J/K with original Ollie (Kerr modded) and Voodoo 5. All were quickly away at Contest Director Mark Poschkens signal. Three super experienced pilots ensured safe flying.

Graeme and Mark had elected to run a two stop race strategy and were comfortably getting 62-3 laps. Rob and Paul had the advantage of extra airspeed with the dark grey DD and were clearly the fastest with a 50 lap range. This means they would have to do an additional pit stop.

Despite the extra stop, they finished the 180 laps first by 3.47 seconds from Graeme and Mark. That's airspeed for you! Andy and Richard performed well to get third place but lacked the sharp edge both in the air and on the ground that's needed to go well under seven minutes.

Next big Vintage A race should be the NSW State Champs in June. As it's in NSW we may need 52' lines and there will be 'B Grade' Vintage A to encourage participation from those less experienced who are not yet ready to compete against the top teams. There will no doubt be a big entry to again showcase Vintage A, Australia's most popular control line racing class.



Paul Stein with his winning Dimpled Dumpling at the Victorian State Championships.

## Vintage A Team Race

		Rd 1	Rd 2	Final
1.	R Fitzgerald/P Stein	3:24.50	3:17.13	6:48.47
2.	G Wilson/M Ellins	3:19.84	3:24.10	6:51.94
3.	R Justic/A Kerr	3:28.63	3:35.53	7:12.06
4.	C Ray/J Ray	4:03.35	3:28.90	
5.	J Hallowell/K Baddock	3:55.84	3:34.41	

6.	H Bailey/P Roberts	3:45.78	3:54.15
7.	M Wilson/L Smith	3:48.94	4:38.68
8.	K Hunting/J Hunting	3:53.43	3:57.60
9.	G Pretty/N Baker	DNF 0	4:09.59
10.	H Simons/G Potter	4:31.92	4:46.85

**CLASSIC B** was supposed to run straight after Vintage A. However, some bright spark thought it would be better to start Combat instead and run Speed on the race circle. Some competitors had planned their day (and Easter family commitments) on the advertised schedule. This caused consternation in the camp and resulted in the Cosmic Rays missing one of their favourite events.

So we were down from 7 teams to 6. Neil Baker again teamed with Greg Pretty and the Grassfire/Magnum GP 25 combo. After some promising practice laps, they were let down by the re-starts in the heats. When circulating, they showed fine form with plenty of airspeed. While all this was happening, Doncaster's Alwyn Smith was showing anyone who was interested a newly acquired plan of an Aussie B Class racer called 'Miss Wendy'. Wendy Campbell was enthused and said she would make sure that Greg's next building project was definitely a 'Miss Wendy' Classic B. We all think he owes it to her....)

Hallowell/Baddock had the Brodak on song in round one with a 3.15.84. That time was the FTD. It was achieved with a totally stock B25R engine with exactly the same specs as everyone else. Nitro was 15% and there is no doubt a lot more speed will come with further experimenting on this engine along with fuels and props.

Lance and Murray had gone for outright speed instead of laps. Their fuel contained 20% nitro, no range ingredients and ethanol instead of methanol that was bought from Bunnings. They were using an LA25 in a borrowed Galaxie, as it was discovered too late the Brodak that threw the RAM and crashed in Sth Oz had slightly bent the shaft.

Ken Hunting had his Brodak going better than the old OS, but the new model was still carrying a gremlin or two so things didn't go as smoothly as planned, even with Rob Fitzgerald controlling the up and down.

Harry Bailey was back in town and with his old pitman Peter Roberts resuming pitting duty, anything was possible. However, they couldn't find the time to do the mandatory run in sequence on their new Brodak and paid the price by not posting a 70 lap time good enough for the last three.



*Lance Smith with a borrowed Galaxie powered by an OS LA25*

Time for the final. Hallowell/Baddock got a quick start and were on a near perfect setting with the Brodak .25. They had reasonable speed and 50 laps plus from the lightweight Rocket. They were well ahead of Wilson/Ellins who had gone off song and slow. Graeme later found the problem to be a loose Nelson plug. Wilson/Smith had lost well over a minute at the start due to a cut finger that contributed to an accidental flood of the OS.

At 53 laps and well in front, Hallowell/Baddock came in for their first pitstop. What happened next was very disappointing and Hallowell/Baddock retired from the race. Keith said later he needs to take a break from racing.

This unfortunate incident opened the door for Lance and Murray to soldier on to first place. They were a minute clear of Wilson/Ellins who finally got going on the last tank, but it was too little, too late. Lance and Murray's win was a reward for perseverance and Lance's many, many hours spent practicing and working on motor, fuel and prop developments.

<b>Classic B Team Race</b>	<b>Rd 1</b>	<b>Rd 2</b>	<b>Final</b>
1. M Wilson/L Smith	3:19.81	3:16.85	8:06.56
2. G Wilson/M Ellins	5:01.84	3:28.18	9:06.31
3. J Hallowell/K Baddock	3:15.84	3:28.18	DNF 53
4. H Bailey/P Roberts	3:40.18	3:56.69	
5. G Pretty/N Baker	3:47.31	3:55.34	
6. R Fitzgerald/K Hunting	4:41.50	DISQ 38	
7. C.Ray/J.Ray	DNS	DNS	



# 2007 VICTORIAN CONTROL LINE STATE CHAMPIONSHIPS RESULTS



## F2F Team Race

		Rd 1	Rd 2	Final
1.	J Hallowell/M Poschkens	4:12.22	DNS	8:37.00
2.	M Ellins/P Cameron	4:30.53	4:17.78	8:48.50
3.	R Fitzgerald/L Smith	4:07.60	DNS	DNF 71
4.	G Wilson/M Wilson	4:27.78	4:26.28	
5.	H Bailey/P Roberts	5:37.60	5:11.66	
6.	C Ray/K Hunting	8:16.41	5:58.56	

## F2C Team Race

		Rd 1	Rd 2	Rd 3	Rd 4	Final
1.	H Simons/G Potter	DNF 69	3:08.45	3:07.56	3:33.31	6:53.10
2.	R Fitzgerald/M Ellins	3:25.27	3:12.38	3:15.97	3:12.68	DNF 183
3.	G Wilson/P Stein	3:11.56	3:25.29	3:13.53	DNF 77	DISQ 184
4.	M Wilson/M Poschkens	3:57.38	3:25.56	3:27.21	3:53.56	
5.	R Justic/L Smith	DNS	DNS	DNF 23	4:16.37	
6.	C Ray/N Baker	DNS	DNS	DNS	DNS	

## F2A Speed

		Rd 1	RD 2	Rd 3	Km/h
1.	Robin Hiern	12.927	13.19	13.14	278.4
2.	Richard Justic	NT	NT	13.16	273.5
3.	Noel Wake	15.46	15.13	NT	237.9
4.	A Kerr	NT	NT	NT	

## Vintage Stunt

		Static	Rd 1	Total
1.	Doug Grinham	122	169.5	291.5
2.	Frank Battam	144	118	262
3.	David Nobes	122	139	261
4.	David Lacy	111	114.5	225.5
5.	Mark Usher	110	112	222
=6.	Bill Swan	84	123.5	207.5
=6.	Ken Maier	110	97.5	207.5

## 1/2 'A' Combat

		1	2	3	4	5	6	7	8
1.	Robert Owen	W	W	W	W	W	B	W	W*
2.	Keith Baddock	W	W	W	W	W	W	B	L*
3.	Peter Norrie	W	W	W	W	W	L	L	
=4.	Mark Ellins	W	W	W	L	L			
=4.	Murray Wilson	W	L	W	W	L			
=6.	Ian Amaira	W	W	L	B	L			
=6.	Graeme Wilson	W	W	L	L				
=6.	Tony Caselli	W	W	L	L				
=9.	Paul Stein	L	W	B	L				
=9.	Leon Baird	L	W	L					
=9.	Ken Hunting	W	L	L					
=12.	Greg Pretty	L	L						
=12.	Shaun Power	L	L						
=12.	Tom Linwood	L	L						
=12.	Matt Shears	L	L						
=12.	Ken Maier	L	L						
=12.	Harry Bailey	L	L						
=12.	Adam Kobelt	L	L						

\*Elected to fly sudden death

## Vintage 'A' Team Race

		Rd 1	Rd 2	Final
1.	R Fitzgerald/P Stein	3:24.50	3:17.13	6:48.47
2.	G Wilson/M Ellins	3:19.84	3:24.10	6:51.94
3.	R Justic/A Kerr	3:28.63	3:35.53	7:12.06
4.	C Ray/J Ray	4:03.35	3:28.90	
5.	J Hallowell/K Baddock	3:55.84	3:34.41	
6.	H Bailey/P Roberts	3:45.78	3:54.15	
7.	M Wilson/L Smith	3:48.94	4:38.68	
8.	K Hunting/J Hunting	3:53.43	3:57.60	
9.	G Pretty/N Baker	DNF 0	4:09.59	
10.	H Simons/G Potter	4:31.92	4:46.85	



Noel Wake Robin Hiern Richard Justic

The 1/2A Combat scene here in Victoria Aust was a joy to behold on Easter Saturday at the Victorian State Championships. There were 19 entries with a mixed bag of models and engines taking part. The ground was covered with dead grass and was hard. Warm weather and a slight breeze made for super flying conditions.

Quite a few people had new Cyclon .09 powered Moldova manufactured models that performed very well.

The two contestants that reached the final round both had managed to arrive without incurring a loss but as darkness was approaching they decided to have a one-bout fly off to decide the winner. Robert Owen from NSW came out on top with local entrant Keith Baddock taking second place.



The Hunting brothers "Dream Team" were in action again this year. Ken Hunting is seen here holding their Vintage A racer.



Combined Speed Class	Flight 1	Flight 2	Flight 3	% of Record
1. Robin Hiern 4	14.88	<b>12.44</b>	NF	100.08
2. Robin Hiern 1	<b>14.51</b>	14.83	14.54	98.69
3. Robin Hiern 5	14.45	14.61	<b>14.28</b>	98.18
4. Noel Wake 1	14.66	<b>14.63</b>	15.55	97.88
5. Robin Hiern Proto	25.89	<b>25.18</b>	26.47	95.83
6. Noel Wake 5	ATT	ATT	<b>14.90</b>	94.09
7. Richard Justic 1	16.67	<b>16.66</b>	NF	85.95
8. Kim Wareham 049	26.47	<b>22.73</b>	27.22	70.57
9. Richard Justic 2	<b>14.59</b>	ATT	14.61	68.54
10. Vern Marquet 1	<b>22.19</b>	22.44	22.65	64.53
11. Vern Marquet Proto	<b>40.51</b>	43.19	43.10	59.57
12. Ken Hunting 1	27.53	<b>24.45</b>	NF	58.57
13. Robin Hiern 2	ATT	NF	NF	0.00
13. Robin Hiern Sp Jet	NF	NF	NF	0.00
13. Noel Wake 4	ATT	ATT	NF	0.00
13. Noel Wake Proto	ATT	ATT	NF	0.00
13. Steve Hacking 049	ATT	NF	NF	0.00



Robin Hiern with some of his speed models.

F2B Aerobatics	Total
1. Craig Hemsworth	1103.00
2. Murray Howell	1102.08
3. Doug Grinham	1062.17
4. Frank Battam	1047.59
5. Mark Ellins	1040.25
6. Dave Simons	974.42
7. Bill Swan	899.50
8. Damian Sammut	892.75
9. Greg Barclay	827.92
10. Leon Baird	796.08
11. Sean Frith JNR	779.59
12. Dave Lacy	673.92

Sadly for Dave Simons things did not go to plan in F2B

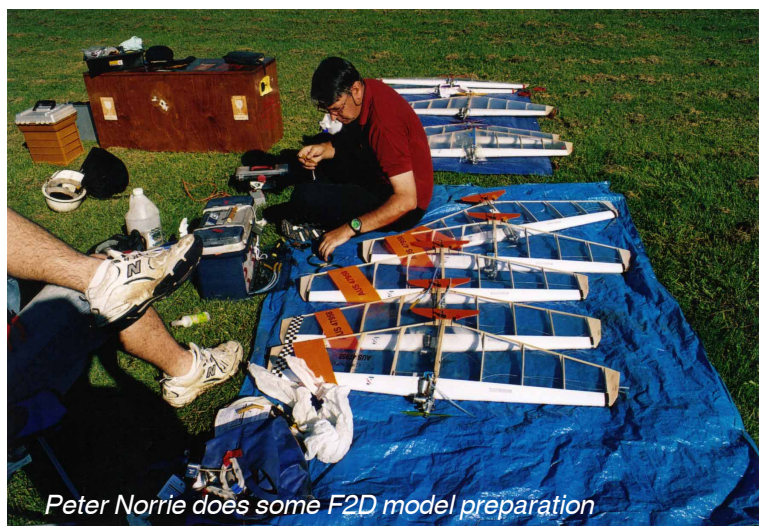


Classic 'B' Team Race	Rd 1	Rd 2	Final
1. M Wilson/L Smith	3:19.81	<b>3:16.85</b>	8:06.56
2. G Wilson/M Ellins	5:01.84	<b>3:28.18</b>	9:06.31
3. J Hallowell/K Baddock	<b>3:15.84</b>	3:28.18	DNF 53
4. H Bailey/P Roberts	<b>3:40.18</b>	3:56.69	
5. G Pretty/N Baker	<b>3:47.31</b>	3:55.34	
6. R Fitzgerald/K Hunting	<b>4:41.50</b>	DISQ 38	
7. C Ray/J Ray	DNS	DNS	

F2D Combat	1	2	3	4	5	6	pts
1. Murray Wilson	L	W	W	W	W		3
2. Peter Norrie	W	L	W	W	L		1
3. Robert Owen	W	W	L	L	W*		0
4. Graeme Wilson	L	W	W	L	L*		0
5. Greg Pretty	W	L	L				-1
6. Tom Linwood	L	W	L				-1
7. Leon Baird	L	L					-2

\*3<sup>rd</sup> place fly off

Midge Speed	Rd 1	Rd 2
1. Ken Hunting	10.13	<b>10.08</b>
2. Noel Wake	<b>11.63</b>	ATT
3. Vern Marquet	ATT	
4. Colin Ray	NT	NT
5. Kim Wareham	DNS	DNS



Peter Norrie does some F2D model preparation

Goodyear	Rd 1	Rd 2	Final
1. R Fitzgerald/G Pretty	<b>3:27.66</b>	DNS	7:08.68
2. G Wilson/M Ellins	<b>3:55.00</b>	DNS	7:39.04
3. M Wilson/A Lumsden	<b>4:06.13</b>	DISQ	DNF 122
4. K Hunting/N Baker	6:01.00	<b>4:55.03</b>	
5. C Ray/J Ray	7:08.66	<b>6:08.00</b>	
6. H Bailey/R Virgo	<b>6:11.53</b>	6:34.72	

Goodyear top three teams





# 2007 VICTORIAN CONTROL LINE STATE CHAMPIONSHIPS RESULTS AND PICTURES

## Simple Rat Race

		Rd 1	Rd 2	Final
1.	H Bailey/P Roberts	104	83	209
2.	C Ray/J Ray	101	108	206
3.	G Wilson/M Wilson	102	99	199
4.	K Hunting/M Ellins	99	101	





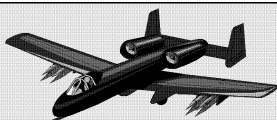


Right:- Mark Poschkens during the warm up in F2F T/R

Left:- Vintage A Team race at Knox. Murray Wilson and Harry Bailey piloting and an attentive crowd in the background.



## CONTEST RESULTS



Combined Speed at Frankston 22/04/07



Pos	Name	Class	Engine	Flight 1	Flight 2	Flight 3	Fastest	Km/h	%
1.	R Hiern	Class 1	OS 12	14.22	DNS	DNS	14.22	253.16	100.70%
2.	N Wake	Vintage Proto	MAGNUM 25	DNF	NEL	38.00	38.00	152.46	94.74%
3.	N Wake	Class 5	Novarossi 21	NEL	15.11	DNF	15.11	238.25	92.79%
4.	R Hiern	1/2A	AME .049	18.72	17.91	20.52	17.91	161.74	89.56%
5.	K Hunting	Midge	Taipan	11.53	10.28	DNS	10.28	140.90	86.09%
6.	N Wake	Class 1	Novarossi 12	16.79	16.67	DNS	16.67	215.96	85.90%
7.	M Wilson	Classic Fai	Rossi 15 rv	18.99	23.22	nt	18.99	189.57	74.78%
8.	S Hacking	1/2A	AME .049	NT	22.28	22.25	22.25	130.19	72.09%
9.	V Marquet	Class 1	ASP10	22.93	22.71	22.77	22.71	158.52	63.06%
10.	K Wareham	1/2A	AME .049	NT	NT	NT			0.00%

## Results SSME Luddenham March 25, 2007

Team	Heat 1	Heat 2	Final
<b>Phantom Team Race</b>			
P. Champs / S.Pilgrim	4.46.50	_____	9.52.81
J.Nolan / S.Rothwell	DNF	_____	11.10.62
P.Brodie / A.Kerr	9.43.37	5.52.59	12.03.47
T.Bonello / A.Heath	120LapsDSQ	100LapsDSQ	

### Vintage A Class Team Race

D. Hines / S.Rothwell	3.17.00	_____	6.41.25
G.Potter / R.Harvey	3.20.12	_____	6.44.05
P.Camps / S.Pilgrim	_____	_____	159 Laps
R.Justic / A.Kerr	_____	_____	

### Vintage A Class (B Grade) Team Race

R.Harvey / T.Linwood	3.44.56	_____	10.50.00
G.Potter / L.Hines	4.24.82	_____	11.51.69
P.Brodie / A.Kerr	3.49.13	_____	112 Laps

### Vintage 1/2A Team Race

P.Camps / S.Pilgrim	4.14.24	4.21.06	8.55.44
J.Nolan / S.Rothwell	4.16.43	4.24.39	8.55.66
R.Fairall / R.Justic	4.57.78	4.31.83	9.28.68
P.Brodie / A.Kerr	6.53.03	_____	



Regards  
Tony Bonello

# Fuel Blockage in Glow Engines

Article by Alan Lumsden.

How often does this happen, and would a fuel filter installed in the line prevent the blockage?

What we need to find out is what causes a blockage so let's think about a few things. Let's assume that we use about 20% castor oil in our fuel.

Sometimes the oil may have very small globules in it and some times methanol may have some very small snowflake like floaty bits in it. When mixing fuel I filter the methanol through some ladies stocking material into the mixing container and then again filter the mixed fuel into the container to be used at the flying field.

O.K. we have clean filtered fuel but still get a blockage. Now we need to think a little more (if possible).

- 1/ How long ago is it since the engine last ran?
- 2/ Did the engine run out of fuel?
- 3/ Has a metal fuel tank got any surface rust in it?
- 4/ Did the engine stop (various reasons) before the fuel tank was empty?
- 5/ Did I wash the tank and needle valve out before hanging the model up on the wall or shelf?

After nine months or so we take the model to the field, fill it up with fuel and try to start the engine. It will not start!

O.K. open up the needle valve about one turn and now it starts — fiddle with the needle setting to get a tune and take off. Model flies around but does not sound to healthy (could be to lean or a blown glow plug) and then the engine stops, still with plenty of fuel in the tank.

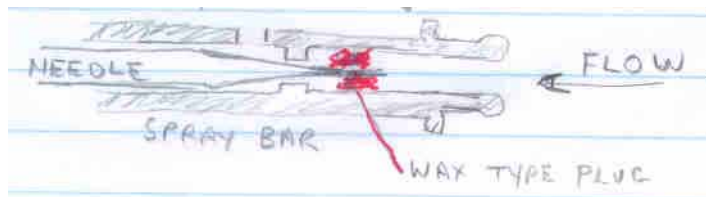
## Question.

What caused the problem?

When the model is in storage for say six months or more with fuel left in the needle valve/spray bar assembly, the methanol evaporates and leaves the castor oil behind to dry out and form a "wax type" plug around the taper part of the needle reducing the area of fuel flow by perhaps 50%. By opening the needle by say one turn the area opens for better fuel flow and this is where the problem starts.

As the fuel flows past the "wax type plug" the plug softens and moves resulting in a "lean run" and the engine may stop functioning and will be very hot. (Hopefully no damage to the engine)

Removal of this small plug at the flying field can be done by removing the fuel feed tubing, remove the needle and reverse flush the valve from the needle side. This should blow out the very small wax type plug.



## NOTE!

An in line fuel filter will not prevent this problem occurring and usage of filtered fuel should make a filter unnecessary.

To prevent a troublesome blockage problem is very simple, don't be lazy and throw the model in the shed after use and forget it. What you should do instead is remove the fuel tube from the spray bar, wash out-flush needle/spray bar assembly and tank with shellite or methanol. This will remove any oil residue and prevent a wax type plug from forming. Spraying a little bit of WD40 into the tank will prevent any corrosion taking place.

It is also a good practice to wash out the internals of a used engine and oil it.

Before going out flying a model/engine that has not been used for a matter of months I strongly recommend washing out and flushing the tank and needle/spray bar assembly as this should prevent any fuel blockage problems.

Alan Lumsden 13474

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