



Charlotte Aeromodelers

Volume 1, Issue 2

January 2012

Presidents Comments

Safety is # 1

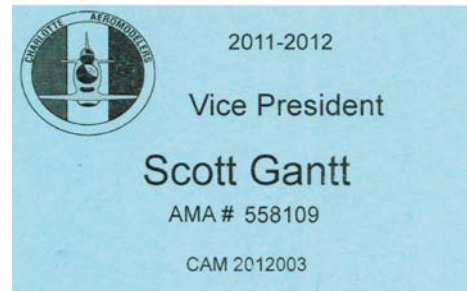
January 3rd was the first meeting with your new board members. There were 26 members in attendance and we had a good time. Several members came early and enjoyed the fine food from Jimmies before the meeting started. Dave Werts opened the meeting and turned it over to me to introduce guest and new members. The club voted in 3 new members, Joe Trippodo, Jeff Clark and Tom Girkins. Jeff's training with Jerry in our try and fly program and has done a great job learning this new hobby. Joe is working with Charlie Pickett and doing a fine job refreshing his skills. Tom Girkins rejoined the club after a short absence. Be sure to say hi to these guys and give them a hand if needed. Dave read the minutes from the last meeting. As soon as Dave finished, I introduced the new board members. We also announced Jim Wolstenholme, the president select board member. Jim has a

Continued on page 2

INSIDE THIS ISSUE

- 1 Presidents Comments
- 1 Membership & AMA
- 2 Plane of the Month
- 3 Member Comments
 - Dave Lange
 - Richard Brown
- 4-6 Club Photo's

Name Badge & AMA Membership



The new design will be smaller as requested by you, the members. We also included your AMA number and a CAM ID number. This new design badge will be a running change throughout the remainder of this year. Everyone will receive a new badge in July. Guys, I would like each of you to wear your name badge at the field to help with identification of club members. Be proud of your C.A.M. membership and wear your badge with pride. I DO! It appears that we have non members flying at the field saying they are members. If you should run across someone flying at the field without a badge, ask them if they are a member. If they are not a member, get their name, phone number and picture if you have a camera and forward to a board member and we will follow-up with them. We will start posting known offenders' pictures on our bulletin

Continued on page 3

long record of successful leadership in both business and RC industry. Jim was president of Keystone Radio Control Club for 4 years and headed up the largest Electric fly-in in the US for 2 years. Your board has 151 years of RC fun and that's scary! You can view the meeting minutes on our web site. For our first meeting, I was pleased with the attendance, but it could be a lot better. Block your calendar for February 7th @ 7:00pm and join in on helping us build your club to the next level.

We would like to thank John Bowling and Bill Semisch for all their hard work keeping the field cut in 2011. I can't say thanks enough to everyone who has helped in 2011.

Membership Drive

Let's start thinking of ways to increase membership. I would like to have a membership drive to increase the number of members in our club. Please send me your ideas.

New Bulletin Board

Special thanks to Dave Werts and Bob Wentzell for building a new covered bulletin board. Job well done!

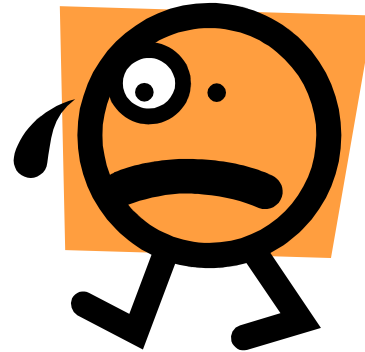
Mowing the field January 25, 2012

We have had a very mild winter this year to date. With the temperatures being in the 50-60 degree range has enabled the weeds to continue to grow, making it more difficult to take off and land smaller aircraft. I would like to thank Dale Ensing and Russ Bullock for mowing the field today. Now that is what we all need to do. Don't wait for someone else. If it needs done, DO IT! Thanks guys!!!! I am sure the whole club will enjoy the nicely cut field.

Continued on page 6

Plane of the Month

January winner of the plane of the month goes to "Roger Krenzin with his STOL Aircraft"



Your President had his head in his "glass" and forgot to take the picture.

Sorry!!!

RC Pilots

You learn from successful failures!

Last Month's AMA publication

Model Aviation's Frequently Used Abbreviations / Acronyms

AMA	Academy of Model Aeronautics	GHz	gigahertz
ARF	Almost Ready to Fly	ID	inside diameter
BEC	Battery Eliminator Circuit	Kv	rpm/volt
CA	cyanoacrylate glue	kV	kilovolt (1,000 volts)
CAD	computer-aided design	LCD	Liquid Crystal Display
cc	cubic centimeter	LE	leading edge
CD	contest director or compact disc	LED	light-emitting diode
CG	center of gravity	LiPo	Lithium Polymer
CL	Control Line	mA	milliamperes
cm	centimeter	MA	Model Aviation
cu. in.	cubic inch	mAh	milliampere-hours
dB	DeciBels Adjusted (noise power calculated in dB [decibel])	MHz	megahertz
DT	determalizer	mm	millimeter
EAA	Experimental Aircraft Association	Nats	AMA Nationals
EPP	(foam) expanded polypropylene	nitro	nitromethane
ESC	Electronic Speed Control	Ni-Cd	Nickel Cadmium
EPS	expanded polystyrene foam	NiMH	Nickel Metal Hydride
FAA	Federal Aviation Administration	OD	outside diameter
FAI	Fédération Aéronautique Internationale	RC	Radio Control
FCC	Federal Communications Commission	rpm	revolutions per minute
FF	Free Flight	RTF	Ready to Fly
		SASE	self-addressed, stamped envelope
		SIG	Special Interest Group
		TE	trailing edge

Members Comments

Continued from page 1 Name Badge and AMA

DAVE LANGE

As my dad was a NASA geek (retired), I get free subscription to Air & Space mag.- an update on flight tech in the world. They kinda of praised the idiot who flew the RC camera plane around New York City in a past issue and caught a lot of flak from the RC community, AMA, the Air Force and a lot of pilots for it. I believe the positive article just published was trying to make up for it. We are all familiar with this, but it apparently got a lot of positive attention from full scale pilots wanting to try something challenging.

<http://www.airspacemag.com>

Click on the article on the web titled "These kids are trying to crash".

Don't know how long it will be posted.

Dave Lange

Richard Brown

Richard sent this informative document on Fuel Efficiency.

The Effect of an Engine Cleaning Fuel Additive on the Fuel Efficiency of an Engine

Andrew Wood
11th Grade
Heathwood Hall Episcopal School

[Andrew Wood Research](#)

Continued on Page 7

CALENDAR OF EVENTS

FEBRUARY MEETING

JIMMIES RESTAURANT IN MINT HILL

TIME: 7:00PM

Monthly Membership Meeting.

Club Membership Promo Video

<http://www.youtube.com/watch?v=pyjxs8q1ecM>

Fred Culbertson

Thank you for this exciting video!

board and I will post them on our web site!

Please be sure to place your current **AMA membership card** on the frequency board when flying at our field. Remember, AMA 2011 memberships have expired and if you do not have a current 2012 membership, we will unfortunately have to suspend your flying privilege.

Please Renew Today!!

Safety Committee

Jerry is looking for at least 5 members to help with safety at the field. You would help with making sure things are being done in a safe manner at the field. This would include: checking membership, AMA cards, seeing that all pilots are flying in the proper flight area, flying from the flight stands, not run engines in pits and any other safety issue that might arise.

Flight Pilot Stations

I've had several members complain about the height of the pilot's flight line fence as it interferes with the radio antenna. So instead of standing behind the fence, they stand in the opening between them. This is against AMA rules. With this concern, I checked with AMA to get a standard fence height. We changed a few sections to the suggested height of 3 feet instead of the 4 foot height. This does eliminate radio clearance issues so we will lower all sections to 3 feet with the exception of the far south section and it will remain 4 feet. We are also constructing 3 new removable pilot stations for the 3D area and we plan on having them ready by the first of February.

Club Photo's

Pictures from Scott Gantt's Air Force



Gene shows us how to land vertical! Great Job!!

Bob Swan still smiling after a flight!



Jim testing new 20cc Engine (should be electrons)

Have Fun! Fly Safe!



Welcome New Members

Tom Girkins smiles after first flight of his new P47!



Joe Trippodo first solo flight. Great Job Joe!



Gene is giving Russ some very important flight instructions!
Don't crash my airplane or I will kick your butt!

Russ, for the last time, You gotta keep your eyes on the airplane! *It's behind you!!!!*



This is what flying is all about!
Friends helping Friends.

President's comments continued from page 2.

New Committee

We are in the process of putting together a committee to seek out sponsors for club events. If you are interested in helping with this project, send me an email. This is a good opportunity for members who are not able to help with field maintenance.

We need your help!



Fred is being prepared to be beamed up to his Starship!



Dave, before your flight would you like to say anything?
Tora! Tora! Tora!



Ed's wrapping up a good day at the Field



Dale is praying for her to come home!



The Effect of an Engine Cleaning Fuel Additive on the Fuel Efficiency of an Engine

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The Effect of an Engine Cleaning Fuel Additive on the Fuel Efficiency of an Engine

ABSTRACT

In this experiment, the effects of an engine cleaning fuel additive, Lucas Oil® Upper Cylinder Lubricant and Injector Cleaner, on the fuel efficiency of an engine were examined. It was hypothesized that if an engine cleaning fuel additive was added to the fuel supply of an engine, the fuel efficiency (how long the engine stays running on a constant amount of fuel) would improve. The null hypothesis was that when an engine cleaning fuel additive was added to the fuel supply of an engine, there would be no difference in fuel efficiency. A total of 24 tests were run: eight using two-cycle gasoline without an additive (untreated) and eight tests using two-cycle gasoline treated with an additive (treated). Eight tests were run using non-treated two-cycle gasoline after the treated gasoline had been run through the engine in order to test the residual effect of the cleaner (untreated after). Using three ounces of gasoline, the average run time for the non-treated tests was 11.69 minutes. With the same amount of fuel, the average run time for the treated tests was 14.47 minutes. With the same amount of fuel, the average run time for the untreated (after) group was 14.18 minutes. Overall, the treated group showed a 23.8 percent improvement in time over the non-treated group, and the non-treated (after) group showed a 21.3 percent improvement in time over the non-treated (before) group. Based on a one-way ANOVA, there was a significant statistical difference between the times of the treated fuel and the untreated fuel, as well as a significant difference between the times of the untreated before and the untreated after. From these results, the hypothesis that the engine cleaning fuel additive would improve the fuel efficiency of the engine was supported, and the null hypothesis was rejected.

TABLE OF CONTENTS

INTRODUCTION	4
MATERIALS	6
EXPERIMENTAL DESIGN	7
METHODS	8
RESULTS	9
DISCUSSION	11
ACKNOWLEDGEMENTS	13
BIBLIOGRAPHY	14

INTRODUCTION

Fuel efficiency is an important aspect of new engines in today's market from both an economic and an environmental perspective. As gas prices skyrocket, fuel efficiency is more important than ever, especially in an economic downturn. If an engine can run longer on a smaller amount of fuel, then this will save the consumer money. It also is important that the maximum amount of energy be utilized from every gallon of gasoline. One way to achieve better efficiency and power is through the use of engine-cleaning fuel additives in a vehicle's fuel.

There are many different types of fuel treatments on the market, each with different purposes. The cleaner used in this experiment was Lucas Oil® Upper Cylinder Lubricant and Injector Cleaner. This product is a fuel additive that claims to improve fuel economy as well as increase power and reduce exhaust emissions. The product claims to remove carbon buildup in fuel injectors and to lubricate vital engine components. This additive is comprised of more than 90% hydrotreated heavy paraffinic distillate, which is a highly-refined form of mineral oil (Lucas). Mineral oil is a byproduct of the petroleum refining process. It is similar to petroleum jelly, only in liquid form.

The additive is designed to improve fuel efficiency by removing carbon and other buildup from the combustion chamber and from the fuel injectors. Unwanted carbon and deposits in the combustion chamber can lead to burned valves, broken piston rings, pre-ignition (pinging), and loss of power (Lucas). Buildup in the fuel injectors can cause loss of fuel economy, loss of power, burned pistons, increased emissions, and injector failure

(Sentry). These effects can be detrimental to engines, and if the problem is not corrected, they can lead to expensive repairs.

New federal requirements set for 2016 will require carmakers to achieve a fleetwide average of 35 miles per gallon in their automobiles. According to NPR, the new technology which will bring about higher fuel efficiency will make the average cost of a new car an estimated 926 dollars more expensive; however, car owners could save as much as \$3000 over the life of the car through better gas mileage. However, even without government input, automakers are motivated to make automobiles more efficient.

The purpose of this experiment is to test the effect of an engine cleaning fuel additive on the fuel efficiency of an engine. The engine used in this experiment was a five-year old Homelite Vac-Attack two-stroke yard blower. The hypothesis for this experiment is that if a fuel system cleaner is added to the gasoline that is being run through an engine, then the fuel efficiency of the engine will improve. The null hypothesis is that if a fuel system cleaner is added to the gasoline that is being run through an engine, then there will be no change. The independent variable in this project is the fuel that is used (treated or non-treated), and the dependent variable is the time in minutes that the engine stays running.

MATERIALS

- Homelite VacAttack Yard Blower
- 1 Gallon 93 Octane Unleaded Gasoline
- Echo® 2-Cycle Fuel Mix (2.6 Ounce Bottle)
- Lucas Oil® Upper Cylinder Lubricant and Injector Cleaner
- Stopwatch
- 3 Oz Measuring Device
- 1 Teaspoon Measuring Scoop

EXPERIMENTAL DESIGN

The following chart was used to record the time (in minutes) that the blower engine stayed running during the trials.

	Untreated Before	Treated	Untreated After
8 Trials			

Dependent Variable: The time (in minutes) the engine stays running.

Independent Variable: The fuel running through the engine (untreated, treated, untreated after).

Constants: Blower, engine speed, outside temperature, amount of fuel used.

The hypothesis for this experiment is that if a fuel system cleaner is added to the gasoline that is being run through an engine, then the fuel efficiency (time engine stays running) of the engine will improve. The null hypothesis is that if a fuel system cleaner is added to the gasoline that is being run through an engine, then there will be no change in fuel efficiency.

METHODS

Before the experiment, the 2.6 ounce container of two-cycle engine oil was mixed with the one gallon of gasoline to be used with the blower. All gasoline in the blower's fuel tank was siphoned, so the tank was empty. Three ounces of non-treated fuel were measured and poured into the fuel tank on the blower. The blower was then run at full throttle until the engine shut off. The time was recorded, and this procedure was repeated for a total of eight trials. For the next set of trials, one teaspoon of the Lucas Oil upper cylinder lubricant and injector cleaner was measured into the 3 ounce cup and then fuel was added for a total of 3 ounces. This mix was poured into the tank, and the blower was run at full throttle until the engine shut off. The times were recorded, and the procedure was repeated for a total of eight trials. The third set was conducted in the same manner as the first set. Three ounces of untreated fuel were measured and poured into the fuel tank on the blower. The blower was run at full throttle until the engine shut off. The time in minutes was recorded, and the procedure was repeated for a total of 8 trials. Means were calculated for each set, and the data gathered was analyzed using a one-way ANOVA.

RESULTS

For this experiment, the chart below was used to record the times that the blower stayed running during the trials.

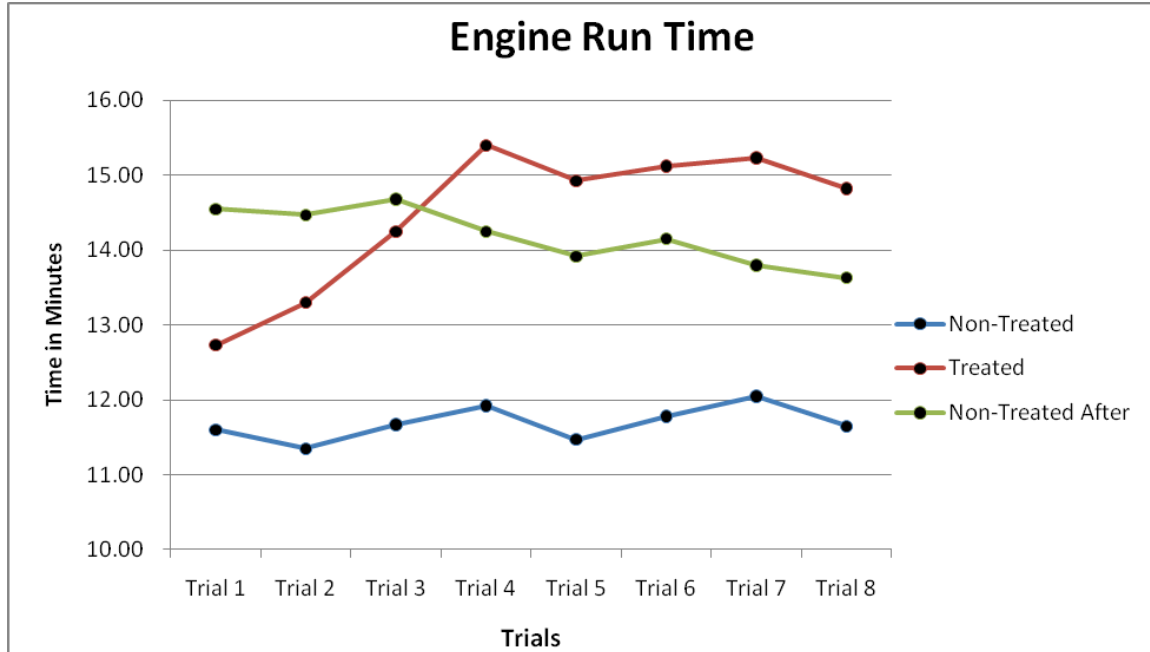
Table 1: Data Collection for Engine Run Time in Minutes

	Non-Treated	Treated	Non-Treated After
Trial 1	11.60 min	12.73 min	14.55 min
Trial 2	11.35 min	13.30 min	14.47 min
Trial 3	11.67 min	14.25 min	14.68 min
Trial 4	11.92 min	15.40 min	14.25 min
Trial 5	11.47 min	14.93 min	13.92 min
Trial 6	11.78 min	15.12 min	14.15 min
Trial 7	12.05 min	15.23 min	13.80 min
Trial 8	11.65 min	14.82 min	13.63 min

Table 2: Averages for the Sets of Trials

	Non-Treated	Treated	Non-Treated After
Mean	11.69	14.47	14.18
Range	.70	2.67	1.05

Table 3: Graph for Times of Trials



As the data above shows, the treated fuel rises significantly over the untreated fuel during the first four trials. The treated fuel rises steadily from the 11.65 minute mark set in the last trial of the untreated, to peak at 15.40 minutes in the fourth trial. This was a 3.75 minute increase in run time from the last trial of the untreated set. However, in trials five through eight, the times leveled off, with run times of approximately fifteen minutes.

The average engine run time for the non-treated tests was 11.69 minutes. The average run time for the treated trials was 14.47 minutes. The average time for the untreated after tests was 14.18 minutes. The treated trials showed a 23.8 percent increase in run time over the untreated group, and the untreated (after) group showed a 21.3 percent increase in run time over the untreated before group.

DISCUSSION

The purpose of this research was to examine the effects of an engine cleaning fuel additive on the fuel efficiency of an engine. The results from this study indicated a statistically significant increase in fuel efficiency between the untreated and treated trials, as well as a significant increase between the untreated before and the untreated after trials.

The surprising results were the times for the untreated after trials, which tested the residual effect of using the additive. Although the times gradually decreased, they all remained above 13.63 minutes, a significant increase over the untreated before trials. There are several explanations for this. First, it shows that the cleaner has done its job, by removing carbon buildup from inside the engine, causing the engine to run smoother and more efficiently. Second, the effect of the additive was not fully shown, as the engine tested was a carbureted engine. The additive is designed to remove buildup not only from inside the engine cylinders, but also from inside the fuel injectors. Since the tested engine did not have fuel injectors, there could be no improvement from cleaning dirty injectors. Therefore, it is most likely that the significant improvement in fuel efficiency came directly from cleaning carbon buildup in the engine chamber.

In a single factor ANOVA test between the untreated and the treated tests, there was a statistically significant difference in fuel efficiency. With a .05 alpha-value, the p-value was .00000164, and the F-value at 62.03 was higher than the f-critical, which was 4.60. In another ANOVA test between the untreated before and the untreated after, there was also a statistically significant difference between the two. The p-value was .00000000021, far less than the alpha value. The F-value was 257.10, much higher than

the f-critical, which was 4.60. This analysis supported the hypothesis, which stated that an engine-cleaning fuel additive, when added to the fuel supply of an engine, will cause an increase in fuel efficiency. In addition to the hypothesis being supported, the null hypothesis was rejected.

The additive, however, does come at a cost. A 32 ounce bottle of the additive costs ten dollars and will treat 100 gallons of fuel. Thus, there is a ten cent cost to treat each gallon of fuel. For example, if a car got 16 miles per gallon, and gasoline was \$3.00 per gallon, it would cost \$3.00 to go 16 miles. However, if this additive was used, it would cost \$3.10 per gallon, but the car could travel 19.68 miles on the same amount of fuel. This takes the cost of driving the car from 18.75 cents per mile down to 15.75 cents per mile, even though 10 cents were added to the per gallon cost of the fuel. The average car is driven 12,000 miles per year, and if it cost three cents less per mile to drive the car, then this would create a savings of \$360 per year.

ACKNOWLEDGEMENTS

I would like to thank Ms. Sondra Wieland, my chemistry teacher at Heathwood Hall Episcopal School for all of her assistance with my project and paper. I would also like to thank my parents, Oliver and Jean Wood, for their support, as well as Mrs. Anne Bivens and Mr. Matthew Swann for all of their help and support.

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