AeroMarine Research
TBPNews - Performance Report

~~~~~~

TBPNews #154-September 9 2012

~~~~~~

>>>> **Tunnel Boat Performance News** >>>>>> (over 5000 members!)

==========

See all TBPNews archives at: TBPNews

In this issue:

********** TBPNews **********

Check out review of Jimboat's 13th Ed. "Secrets of Tunnel Boat Design" book in the last HotBoat magazine printed!

1) Fury wins Cowes Torquay 2012 Powerboat Race

28 August 2012 - 'Microlink PC Fury' and 'Cinzano' continued their epic battle in this year's Cowes Torquay Cowes Powerboat Race, with Fury eventually prevailing to win the classic race for the third time.

Vahid "Vee" Ganjavian and Gareth Williams took the 37 foot Phantom hull to victory, running a pair of 700 horsepower Ilmor engines, winning in two hours and forty two seconds at an average speed of sixty eight miles an hour.

'Cinzano' driven by Markus Hendricks, Simon Wood-Power and Eric Smillie were not far behind finishing four minutes and five seconds later. The team were in fact lucky to cross the finish line with very little fuel left in the tanks. Third was 'Smokin' Aces' driven by Chris and Nick Dodge in three hours four minutes and twenty five seconds. Interestingly all three boats ran with Ilmor engines giving Ilmor Engines a hat trick on the podium.

Results - Cowes Torquay Cowes:
1 – Microlink PC Fury
2 – Cinzano
3 – Smokin' Aces
4 – Hercules Sagemann
5 – Fugitive
6 – Dry Martini

Full race results at: cowes2012.co.uk

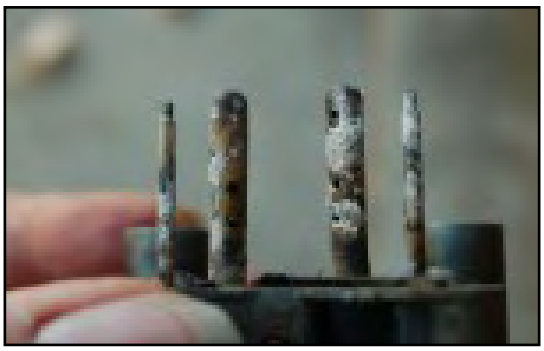
Read more here: cowes.co.uk

and at: luvmyboat.com

********** TBPNews ********** [return to top]

2) Ethanol serves as unnatural gas for boaters

First it was five percent, now many gas pumps display a 10 percent ethanol content. Talk has it that ecology-minded planners, concerned about emissions and air pollution, might push percentages to 15 or more as standard gasoline content.



Mercury Marine did some testing with E-15 gas in 2011 and the results were disturbing. In 300-hour, full-throttle tests of four-stroke and two-stroke engines, excess heat resulted in damaged exhaust valves and bearing failures before the test hours were completed, according to David Hilbert, Mercury Marine engineer. Hilbert noted that other test engines run with standard gasoline had no issues during the 300 hours of testing. Not only does ethanol in gas affect engine performance, the alcohol content in ethanol can damage older units with fiberglass tanks and older rubber fittings. An increase to E-15 content can just make matters worse for area boaters who keep inboard and outboard motors in storage, often for half of the year.

Alcohol blends draw and retain water when boat tanks are left outside during the winter as a result of heating and cooling periods that build up condensation in the gas tank. For this reason, marine engine makers recommend that boaters store their units with the tank nearly or fully filled with gas after the last run each warm-weather season. That caution also goes for buying gas at a pump for marine use. Try to fill up at stations with high-volume use to avoid condensation that may have built up in sales tanks. Savvy motorists, including those doing farm/field work as well as running boat motors, have been adding fuel stabilizers to all their "outside" engines long before the ethanol advent. Many fuel-stabilizing products are on the market; the most popular brand comes in two colors - red for general uses and blue for marine engines. Experts say the red version can be good for intervals of a few weeks, but they suggest running the more expensive and much more effective "blue stuff" in everything from 300-HP outboards to push rotary lawn mowers.

For now, E-10 has caused problems mainly for owners of older marine motors, but alcohol can do damage in any fuel system; difficulties with E-15 gas will be worse. One way to check on alcohol content would be with a test kit that gives readings instantly. A good source for test kits can be found at fueltestkit.com

Check out more at buffalonews.com

and at mercuryracing.com

and at outdoorsfirst.com

********** TBPNews ********** [return to top]

3) OptiMax Powers Johnsson to UIM Offshore 3C Championships

Union International Motonautique (UIM) crowns an Offshore 3C Champion for 2012: it's Marcus Johnsson - again!

UIM Offshore 3C features single outboard powered vee bottom and catamaran hulls (21 to 26 foot) with a driver and navigator. The boats have a minimum weight of 1,850 lbs., less crew. The top speed of the fastest boats is about 105 mph. The Mercury XR2 was the dominant engine before the OptiMax 200XS ROS took the crown in 2005.

Marcus began his Offshore 3C career in 1996, racing a 23-foot Argo catamaran powered by a Mercury XR2 race outboard. He won his first Offshore 3C World Championship in 2001 and his first Offshore 3C European Championship in 2003. Marcus switched from the carburetted 2.0 Liter XR2s to the low emissions, direct fuel injected OptiMax 200XS to win his second European Championship in 2005. He updated hulls in 2007, switching from a 23-foot Argo to the Twister 23, a catamaran designed for rough water.

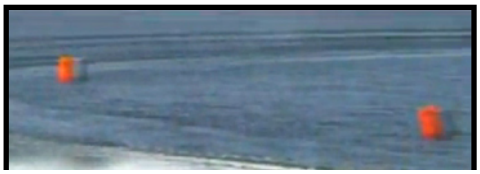
It took a year for Marcus to dial the boat in. By 2009, the boat was rock-solid and Marcus went on to win his third European Championship. The rough course conditions proved his new boat was what he needed to maintain his championship form. A total of 25 teams converged on Nettuno, Italy (near Rome) for the 2009 3C World Championships. Marcus finished third overall (first for catamarans) in a rough first heat. He went on to capture his second World Championship by winning heats two and three over calm seas.

After a couple of lean years, The 2012 race season has been nearly perfect for Marcus. He has won all six national races, as well as capturing his fourth European Championship and third World Championship.

For more information, go to: mercuryracing.com

********** TBPNews ********** [return to top]

4) Great Powerboat Videos



Check out these great videos....

..... History of Tunnel Boat Racing

..... 6 Hours of Paris 1968

********** TBPNews ********** [return to top]

5) FEATURE: "Flight Path" - LIFT - where does it come from?

Aerodynamics in Powerboat design.....by Jim Russell

When is a boat really an airplane? High performance powerboats are getting more benefit than ever before from aerodynamics. A tunnel hull counts on its sponsons for some of the lift for the hull. A vee-bottom boat depends on its narrow running surface (pad) to support its weight. Both have the ability to benefit from additional aero lift - an even greater advantage to further reduce the water drag drastically by supplying lift from its aerodynamic surfaces.

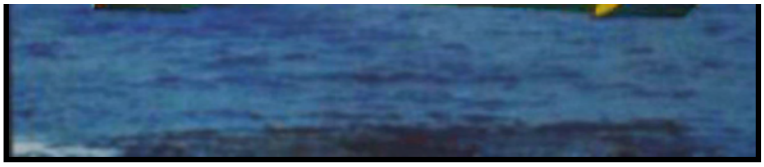
"Ground Effect?" - I thought we were in the water? A properly designed tunnel hull is considered, at high speeds, as a wing in what is known as 'ground effect', even though it's water that it is 'flying' over. There are more similarities that you'd think!

Every pound of lift that can be generated by this "wing" is one less pound of lift that doesn't have to be supplied by the sponsons. So, the trick becomes to squeeze as much lift out of the tunnel (for tunnel boats) and deck surfaces (for vee bottoms) as we can so that we can take some of the load off the sponsons or running pads.

Figure 1 - Formula 1 tunnel race boat

The 'air-lift' of the Tunnel Hull is what sets this type of hull off from all the rest. Although the many factors affecting the aerodynamic forces generated make this a complicated matter at times, the effort is clearly worth it. So, let us look at what factors are involved in creating the lift generated by the tunnel and the deck surfaces, or the 'wing'. The main ones can be summarized as follows:

(a) Airspeed



(b) Angle of attack
(c) Surface Area of Tunnel
(d) Aspect Ratio of Tunnel
(e) Height of mean camber line above the water surface
(f) Aerofoil shape of tunnel cross section

Figure 2 - "Ground effect airplane"

Let's have a closer look at a few of those main factors influencing aerodynamic lift. Some of the references and pictures I've used are based on a typical racing tunnel boat as an example, but the principles and formulae are 100% applicable to all types of tunnel hulls or modified vee-hulls – from recreational tunnels to ocean catamarans; from small radio-controlled boats to F1 racers.

1. Airspeed - Hull speed is not usually the same as the air speed - due to the ever-present wind. True air speed' is approximately the hull speed plus relative wind speed. The lift generated increases just about as the velocity squared, so this is the most important factor to consider in the design of the aerodynamic hull configuration. It is important to design the boat for the speed that it is desired to go. Since the velocity has such significance on the air-lift forces generated, we must know what this velocity will be. Too much lift, and we're airborne! Too little – and we cause more water-drag.

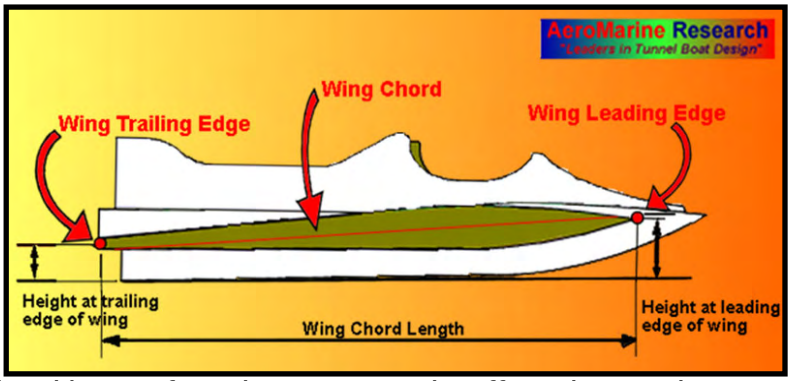
Figure 3 - All performance powerboats can benefit from aerodynamic design

2. Angle of Attack - is the angle between the surface of the water and the 'mean camber line' of the aerofoil. This is often slightly more than the running attitude (the angle between the water surface and the sponson or pad bottoms). Figure 5 illustrates the part of a typical tunnel boat that we are considering to represent the aerofoil section. The chord line is an imaginary line joining the leading edge of the aerofoil to the trailing edge.

The lift of the tunnel hull will increase as the angle of attack increases. Although the drag of the 'wing'

will increase with the angle of attack also, the change is not as rapid. The final effect of all this is an increase in the lift/drag ratio as the angle of attack increases. An increased L/D ratio is, of course, good. It meanswe have a more efficient 'wing' or aerofoil, and that we are getting more good lift, without paying as big a penalty in drag.

Figure 4 - Unstable flight



3. Surface Area - of a conventional tunnel can be approximated by multiplying the distance between the sponsons times the length of the tunnel. In a vee-bottom, it is the effective deck area. The more area - the more lift. The location of this surface area is an important design consideration also, as seen when a close examination of dynamic stability is made (see the detailed discussion of this topic in the "Secrets of Tunnel Boat Design" book), so often there are trade offs to be made between lift efficiency and desired stability.

Figure 5 - Typical tunnel hull 'aerofoil'

...there's lot's more...but that's enough for now!
/Jimboat

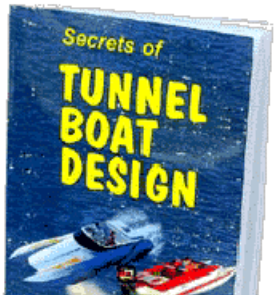
[Ed. Note: Do you have any of your own questions on performance hull design? Send your question or story to Jimboat@aeromarineresearch.com]

See more Performance Articles at: aeromarineresearch.com/articles.html **

Read more about Vee Hull & Tunnel Boat design and setup in the world acclaimed "Secrets of Tunnel Boat Design" book

********** TBPNews ********** [return to top]

6) NEW! 13th Edition "Secrets of Tunnel Boat Design" book



13th Edition "Secrets of Tunnel Boat Design" (ISBN# 1-894933-30-3) - By well-known powerboat design author and race-driver, Jim Russell.

Learn how to design and setup your own tunnel boat, power cat, or modified vee hull for all Recreation, Performance Family hulls, UIM & APBA racing or even RC models. (not just for racing applications!) This new edition has lots of new information; now with over 200 pages,

and well over 150 photographs!

Get the most from your tunnel hull or vee-bottom boat setup.

The new edition includes an added 'History of Modified Tunnel Hull (Mod VP) Design'; an added 'History & Design of Propellers'; and an added 'History & Design of 'Wing in Ground Effect' (WIG) concepts, and the Ten Steps To Performance Powerboat Design. All outlining how they have impacted high performance powerboat and tunnel boat designs.

STBD book features: The developments of the tunnel and V bottoms are interestingly chronicled, with detailed explanations of hull design, function, potential and characteristics. This unique book also details ten design steps for analysis of hull performance and stability showing how the calculations are accurately performed, as well as providing detailed information about their relation to hull performance. The ten steps range from layout design and dimensions, calculating aerodynamic and hydrodynamic lift and drag, power calculations, and stability, acceleration, etc.

STBD book now also includes:
- History of Tunnel Boat Design
- Design of Propellers
- Design of Lower Unit/Drive Units
- History of the Modified Vee hull design
- History of the WIG (Wing in Ground Effect)
- 10 Steps to performance powerboat design

Buy Now

Also..check out the new TBDP© software V7.14 at: aeromarineresearch.com

********** TBPNews ********** [return to top]

7) Powerboat Racing on TV

*** **"*Powerboat SuperLeague*"** Series - Check out show schedule at AmericaOne.com
*** **"*IHBA Lucas Oil Drag Boat Racing*"** Series on SPEED TV - Check next show at speedtv.com
*** ***"War On Water"* TV Show"** on The Water Channel - Check it out at: www.waterchannel.com;
*** **"*Boats on TV*"** - See at: www.boatson.tv
*** ***"American Powerboat Television"*** on The Water Channel - *See*: americanpowerboat.tv
*** **"*Honda Formula 4-Stroke Powerboat Series*"** - Check it out at: www.f4sa.co.uk

********** TBPNews ********** [return to top]

8) Jimboat's Feature Articles

NEW Jimboat Article Announcement! - Author Jim Russell writes in POWERBOAT & RIB magazine!

Jimboat outlines secrets for 'Successful Propeller Testing for Performance'

Jimboat details the speed secrets of 'Vee pad design', vee hull design and performance powerboat design

Jimboat explains 'Gearcase & Propeller BlowOut' (RIB magazine April 2011 issue)

Jimboat explains 'Chine Walking' (RIB magazine Dec 2010 issue)

Jimboat explains 'How Trim Angle and engine height affects performance' (RIB magazine Jan 2011 issue)

Jimboat interviews in RaceBoat International magazine, the newest up-and-coming star of F1 H20 World Championship circuit, Shaun Torrente together with his Crew Chief Ted Gryguc.

[Jimboat writes Feature articles in PowerBoat & RIB magazine, HotBoat, Family&Performance Boating, Performance Powerboat, RIB magazine, World of Powerboats, RaceBoat International, SEA Yachting, Extreme Boats magazines].

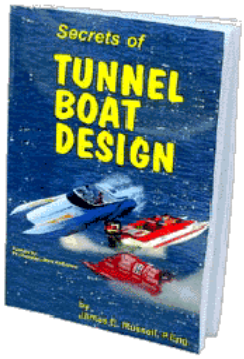
- Tunnel Vision - 'How Do Tunnel Boats Fly?' - HB Nov/Dec 2008
- 'Why Do Boats Create Rooster Tails?' - HB-August 2008
- 'What a Blow Out!' - "Gearcase & Propeller Blowout- Why it Happens & How to Fix it" - HB-June 2008
- 'Walk on the Wild Side' - "Chine Walk - Why it happens & How to Fix it" - HB-Jan 2008
- 'Hump Zone' - "Why does your Boat Porpoise?" - HB-April 2007
- 'The Bottom Line'-"Why does a Pad make a Vee Hull faster?" - F&PB-Sept 2005
- "10 Smokin' Speed Secrets Revealed..." - HB-Feb2005
- "Winterizing your Performance Outboard" - F&PB-Jan2005
- "What a Drag" - 'Trim Angle & Engine Height Can Reduce Drag and Increase Speed' - HB-Sept2004
- "10 Safety Tips" - 'Ten Safety Ideas for High Performance Go-Fast Boats' - HB-Aug2004
- "Flight Path" - 'Where does Lift Come From?' - HB-April2004
- "Rocket Science" - 'How To Increase Your Hull's Design Speed With Aerodynamics' - World of Powerboats-Winter2004
- "Tunnel Vision" - 'What Factors Influence Tunnel Hull Performance' - Extreme Boats-April2003
- "Step-by-Step" - 'Step Design in Powerboats' - TBPNews #88, October 2005

********** TBPNews ********** [return to top]

See you next time!
/Jimboat
>>>>>>>>>>>>>>>>>>>>>

Let us know ideas you have, requests for articles, questions or comments on TBPNews. Send

comments to TBPNews@aeromarineresearch.com
>>



Get your full, illustrated, *13th edition* copy of the world acclaimed "Secrets of Tunnel Boat Design" book;
"History of Tunnel Boat Design" book, "Secrets of Propeller Design" book, the
"Tunnel Boat Design" software
for tunnel and high-performance Vee-hull design, and "PropWorks2" software for speed prediction and propeller
selection at the AeroMarine Research web site: http://www.aeromarineresearch.com