

AeroMarine Research

TBPNews - Performance Report

TBPNews #122 – October 22, 2008

>>>> **Tunnel Boat Performance News** >>>>>> (over 5000 members!)
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1) Price Storms to Win in China F1



American Jay Price pulled off a remarkable victory despite having his favorite propeller break in morning practice to come away with his 2nd victory of the season and now the Qatar Team driver now leads the championship by a comfortable 30 points. His top 5 challengers for the championship all dropped out of the 8th Grand Prix of China in Liuzhou at the 5th race of the U.I.M. F1 World Championship.

Price took command of the race only after the first four drivers dropped out with the most spectacular action coming on the first turn of the race when Italian Guido Cappellini cut across in front of 3rd place qualifier Ahmad Al Hameli of Team Abu Dhabi and caused the young driver to spin out ending his race in front of the rest of the field that was charging into the opening pin. The Tamoil F1 driver was able to continue before dropping out in 2nd

spot after 14 laps once again hurting his chance to win his 10th title in 2008. Meanwhile, Team Abu Dhabi teammate Thani Al Qamzi moved into 2nd chasing leader Sami Selio until he left the race on the 8th lap with trim failure and for the 5th time this season gaining no points.

Selio driving quickly in his Woodstock Red Devil Racing BABA hulled boat had built up over a straight away length lead on the rest of the field before his boat came to a stop on the 39th lap ending his hopes of winning his first event of 2008 as the defending World Champion.

The next round of the championship will be in two weeks as the 6th race of the 2008 season will be back in Shenzhen for the 2nd straight season.

check out more at: f1boat.com

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2) Feature Article "Can Sport Tunnels (& Modified Vees) Blow Over?"



Analysis and proper design of a high performance tunnel hull is a tricky balance of aero and hydrodynamic forces, that change at every different speed on every hull configuration. We have done some examination of typical modified-vee (Mod-VP) style sport tunnel hulls, and find the performance simply *outstanding!* (see article [STV Euro Ski 19 Performance Analysis](#)). Of course, these are high performance tunnel hulls, and when pushed beyond their limit, can behave erratically - so experience and caution is important. We use the AeroMarine Research® "[Tunnel Boat Design Program](#)®" software to help with the analysis, since it has features that make "tuning" the performance analysis easy for top

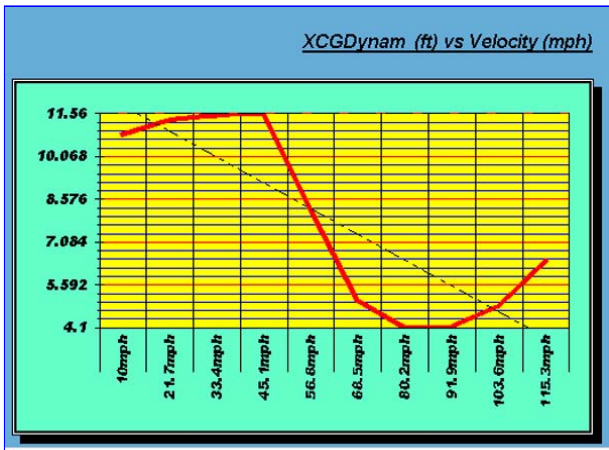
speed, acceleration and/or stability simulation.

How much Lift? - One of the questions raised by our readers is... "does anyone know how much aerodynamic lift these boats generate, and at what speeds?" These types of hulls are quite good at generating aerodynamic lift. The lift is generated by the ground effect of the aerofoil (wing section and tunnel roof) operating in close proximity to the water surface. In our example boat, the aerodynamic lift generated is about 60 lbs @ 40 mph; 311 lbs @ 87 mph; and 413 lbs @ 100 mph. This is probably as much as 28% of total lift at this speed. The angle of attack at high speeds is optimum at 1.6 to 1.9 degrees.

You can't balance on the Trailer - Another point made by readers is that of changing lift characteristics as the sport tunnel accelerates through its speed range. The location of acting forces is constantly changing in a tunnel boat. (This is why you can't really "balance" your tunnel hull while it's still on the trailer). One reader described his STV behavior at operating speeds, as "wanting to be sucked onto the water at a specific speed". This phenomenon, when observed, is actually the change in dynamic center of gravity (CGDynamic) as the balance of aerodynamic and hydrodynamic forces change. The observation of "tail lift" at certain speeds, is actually the result of the CGDynamic moving as the balance of forces change. On a test hull, the CGDynamic is located approximately +9 ft (fore of transom) at 40mph; it moves aft to +3 ft at 87 mph, and it moves back to +4 ft at 100 mph. (The aerodynamic center of this hull is approximately +10ft throughout the speed range). That's allot of moving around for the "balance" of the hull - and it's tycpial. This shifting of CGDynamic is what makes the tunnel so "interesting" (fun) to drive.

The "Hump Zone" - Another reader referred to the "hump zone" - a term that I have used in articles and discussions to describe the transfer of aero and hydro Lift forces. Since a tunnel hull cannot be inherently aerodynamically stable, I use a measure of stability that references the "Dynamic CG of the hull", using in part, the aerodynamic center of pressure from the "wing" or aerofoil of the hull (referenced fore (+) of the transom). The dynamic CG and the center of pressure (XPRESS) will change throughout the range of operating velocities. (To maximize design stability at operating velocity, dynamic CG should be ahead of the aerodynamic center of the wing (aerofoil) section, XPRESS). [*also check out my article 'Hump Zone' - "Why does your Boat Porpoise?"*]

Well, this (example hull) design, like most tunnels of this size, sees its inherent instability (referred to as the "porpoising hump") at about 55 mph, when the aerodynamic forces start becoming more important. In this case, we can define the stability measure as the change in the location of the XPRESS.



From analysis of the test hull (same as most all tunnels, by the way) we can see that XPRESS is constantly moving forward (getting less stable) - but as long as this change is at a reasonably slow and steady (constant) rate, the driver's attention and skill is able to compensate. (Those of you that drive tunnels or ModVP hulls will surely know the feeling of this "compensation" and driving through the "Hump Zone").

This hull maintains a remarkably consistent rate of change in XPRESS, indicating that it will have a very stable "feel" to it throughout it's velocity range. Nevertheless, the "hump zone" or "transition zone" is always very apparent in all ModVP hulls, often observed as "porpoising" if not controlled with trim or driven through quickly.

The [TBDP software](#) does a great job of showing where the "hump" zone will be. It really helps us to design the "hump" to a velocity range

that is 'least disruptive' to the type of driving expected to be done. There are some design things that can be done to 'move' the transition zone somewhat, and to make it easier to drive through. All part of the game.

See more Performance Articles at: <http://www.aeromarineresearch.com/articles.html>

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3) Fountain Team Wins Second Consecutive P-1 World Championship



Fountain Worldwide, led by throttleman Craig Wilson and driver James Sheppard of England, became the first powerboat racing team to win consecutive Powerboat P1 World Championships.

The 14-race 2008 powerboat season culminated in Portugal in late September with Wilson, Sheppard and the rest of the 12-person race team hoisting the series trophy.

The team took four checkered flags and had nine total podium finishes. In two years, Team Fountain Worldwide has won 55-percent of the races it has entered.

For more on the Powerboat P-1 series, visit www.powerboatp1.com

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4) UIM World F1 look at four stroke options



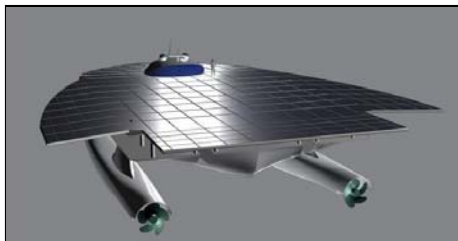
There is another rumour that 2 stroke engines are being phased out for the World F1 Series and that will mean F1 will have to look at 4 stroke alternatives. Several years ago at a meeting at a hotel in Germany, the F1 promoter met up with representatives of several leading engine makers from the motor racing world. The outcome was, 2.5 litre powerpacks from the likes of BMW, Porsche and Cosworth were very expensive and they would have to be adapted to a middle unit and gearbox from an outboard maker.

However the majority of today's major outboard makers produce 4 stroke powerheads of 2.5 and 3 litre. It's a case of would Suzuki, Yamaha and Honda consider investing in a high revving competition engine as the marine market is miniscule compared to the motorcycle industry. The F1 promotor met interested parties in the US recently and is quietly confident Mercury can come up with the goods although their current crop of larger engines are 2 stroke with low emissions. Expect an important announcement regarding 4 strokes in F1 at the 2008 UIM Convention in Australia.

Check out more at worldofpowerboats.com

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5) Solar Powered Catamaran Powerboat Circumnavigation



PlanetSolar has a plan to be the first to circumnavigate the globe in a 'solar' powerboat, i.e. one powered by a silent, pollution-free electrical engine, driven exclusively by solar energy.

The biggest solar boat of the world will begin its world tour in 2010, with a new design. PlanetSolar will achieve the first round-the-world sea voyage powered by solar energy. The world tour will be made on board a revolutionary 30-meter long catamaran covered with 470 square meters of photovoltaic solar panels. The first solar-powered round-the-world voyage – scheduled for 2010 – will run from East to West, along an equatorial route. PlanetSolar has brought together an international team of physicists, engineers, boat builders and a variety of people who all realize the importance of renewable energies and environmental protection.

check out more at: powerboat-world.com or planetsolar.org

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6) NEW Powerboat History & Design Books On-line

Most complete supply of over 50 books specialized performance powerboat history, design and racing.

Check out the new powerboat book additions: [Powerboat Design & History books](#)

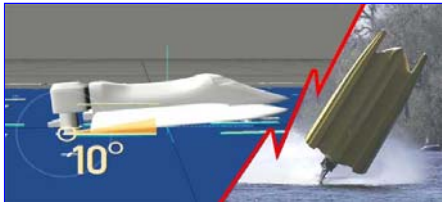
Also...get past archives of "[TBPNews](#)"

And...check out [free articles](#) by author Jimboat.

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7) Powerboat Racing on TV

*** **"Thrill Zone: Extreme Powerboats"** - National Geographic powerboat show.



Author **Jim Russell** (Jimboat) is powerboat design technical consultant on a new National Geographic special for "Thrill Zone" series...

Details at: (channel.nationalgeographic.com)

check out next show date at AR's website! aeromarineresearch.com/NatGeo_thrill-zone.html

*** **"Streaming Motorsports"** on Speedbox.tv - Parker ENZED Jetsprinting Championship - - Check at: speedbox.tv

*** **"Champ Boat Grand Prix Series"** - on SPEED Channel - Check next show at: www.champboat.com or at: www.speedtv.com

*** **"F1 World Championship TV Show"** on The Water Channel - Check it out at: www.waterchannel.com; [see web site for other show times]

*** **NEW "War On Water" TV Show** on The Water Channel - Check it out at: www.waterchannel.com; [see web site for other show times]

*** **"Powerboat Showcase"** on The Water Channel - Check it out at: www.waterchannel.com; [see web site for other show times]

*** **"Offshore Classics"** on The Water Channel - Check it out at: www.waterchannel.com; [see web site for other show times]

*** **"American Powerboat Television"** on The Water Channel - Check it out at: www.waterchannel.com; [see web site for other show times]

*** **"Honda Formula 4-Stroke Powerboat Series"** - Check it out at: honda-racing.co.uk

[Ed. Note: The Water Channel is available on [The Dish Network](#)]

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8) Jimboat's Feature Articles

Watch for upcoming articles by Jimboat in "[Performance Boats](#)" magazine and "[HotBoat](#)" magazine!



NEW Jimboat Article Announcement! - Author Jim Russell explains '[Why Boats Create Rooster Tails](#)'

Check out full article at: aeromarineresearch.com

Jimboat writes Feature articles in HotBoat, Family&Performance Boating, Performance Powerboat, World of Powerboats, Extreme Boats magazines.

- '[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

