AeroMarine Research
TBPNews - Performance Report

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TBPNews #137 - February 7, 2011

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

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In this issue:

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

1) P1 set to revolutionise powerboat racing with new boat and (BRP 250HO E-Tec) engine

Powerboat P1 Management unveiled its new P1-28SS race boat at the opening day of Autosport International at the NEC in Birmingham, UK. This revolutionary new powerboat will be rigged with BRP's Evinrude 250 H.O. E-TEC engine.

The P1-28SS is the culmination of eight months of development and investment by P1 in Britain and the USA, and the collaboration with BRP is set to revolutionise the sport of mono-hull powerboat racing. Featuring the latest technology in safety, hull design, digital telemetry and data acquisition, the P1-28SS will debut in SuperStock Championships in the UK, USA and Norway this year as part of a far-reaching overhaul of Powerboat P1's sporting and commercial activities.

The initial concept design for the new boat was formulated by P1 and its design team led by Raimondo Iuretig. The concept was then digitally designed by some of the marine industry's leading engineers ahead of three prototype vessels undergoing extensive trials in the USA. Construction materials have been carefully selected to optimise weight distribution and maximise endurance and safety. The cockpit design itself has been engineered to provide many of the elements of an enclosed cockpit in an open-cockpit configuration, ensuring maximum safety protection from water impact and collision. P1 worked closely with the Union Internationale Motonautique (UIM) and the RYA in the design and development process.

At 28ft (8.5m) long and capable of speeds up to 75mph, the boat represents exceptional value for money and is designed to make powerboat racing more accessible than ever before. To assist teams and attract new racers, P1 is offering a range of cost effective options including lease deals and arrive-and-drive packages.

BRP's first participaion in a world-class racing series supports P1's commitment to move the sport to a new level. With the P1 SuperStock Championship expanding to the USA and Norway this year, Powerboat P1 felt that it was imperative to work with an international marine industry partner that could offer high quality, innovative products, global reach and support for its vision of building powerboat racing from the ground up with a series that is

accessible at all levels.

This year's UK SuperStock Championship will run from May to September with racing at five venues:
May 14-15 or 21-22 Cornwall
June 11-12 Jersey
July 23-24 Plymouth
September 3 Lymington
September 10-11 Liverpool

Check out more at: powerboat-world.com

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2) North American Champ Shaun Torrente Joins F1 Team Sweden!

The most talented driver in North America is finally going to get his first taste of international competition this upcoming season as Miami, Florida driver Shaun Torrente will team with Swedish driver Jonas Andersson starting at the opening race of the 2011 UIM F1 H2O World Championship at the ninth Grand Prix of Qatar the weekend of the fourth and fifth of March on Doha Bay.

The two time defending North American title holder who has won three-quarters of all races in America the past three years, is excited about his new team and his new teammate.

The 31 year-old driver from South Florida has 31 North American F1 career starts and has won a third of his races and currently sits seventh overall in the all-time winning drivers list. Shaun, will be joined by his close friend and mentor Ted Gryguc of Woodbridge, Ontario Canada. Ted is a well respected retired driver who has raced in the Mod-VP and Champ Lights (SST-45) classes winning various championships when he was an active driver in the 1980's and 1990's.

The multi-national American with Italian-Cuban blood lines has won two SST-120 (F2) North American titles in 2001 and 2003 along with three national titles in the ultra competitive SST-45 (F4) class as well. While racing a decade ago he was attending Florida State University and now owns his own business in Homestead, Florida a southern suburb of Miami.

check out more at F1H2O.com

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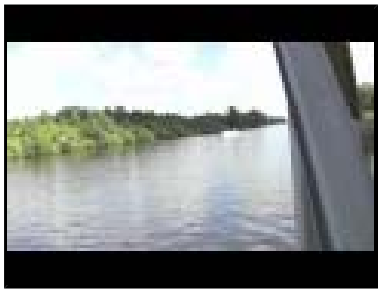
3) Great Powerboat Videos



Check out these great videos....

Too Rough for Tunnels? 24h de Rouen 2008

Evinrude 1989 V8 speed record attempts (Part 1 & Part 2)

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4) Mercury MerCruiser introduces the new 4.3 MPI ECT

FOND DU LAC, Wis. – The new 4.3 MPI ECT (Emissions Control Technology) engine is the latest in Mercury MerCruiser's comprehensive lineup of catalyzed engines ranging from 135 hp to 430 hp.

Scheduled to be released in January 2011 and rated at 220 hp, the 4.3 MPI ECT is designed to power everything from family runabouts to cruisers and houseboats. The catalyzed engine provides clean power that meets EPA and California Air Resources Board emissions regulations – ensuring the engine can be registered without limitations. The 4.3 MPI ECT – complete with new, fresh styling – joins six other catalyzed engines in the MerCruiser sterndrive lineup, including the 3.0 MPI ECT, 5.0 MPI ECT, 350 MAG ECT, 377 MAG ECT, 8.2 MAG ECT and 8.2 MAG H.O. ECT.

Like the popular non-catalyzed version, the 4.3 MPI ECT is built with a reliable V6 GM cast iron base engine, offers the exclusive Engine Guardian Protective system and is compatible with Alpha and Bravo drives. The Mercury Marine engineering team has developed an engine that not only performs on-par with the non-catalyzed version, but also is quieter and more fuel efficient. In recent tests, the 4.3 MPI ECT proved to be 5 to 10 percent better in fuel efficiency at cruising speeds and 5 percent quieter in pass-by noise measurements.

Boat builders and service technicians will appreciate the simplified installation process and increased serviceability of this engine, which includes an easy-to-reach hot stud location, an easy-to-access oil cap, improved dipstick, color coded service points and easy maintenance features.

The 4.3 MPI ECT is available with MerCruiser's exclusive SeaCore System with best-in-class corrosion protection and SmartCraft Integrated Marine Technology.

See more at: mercurymarine.com

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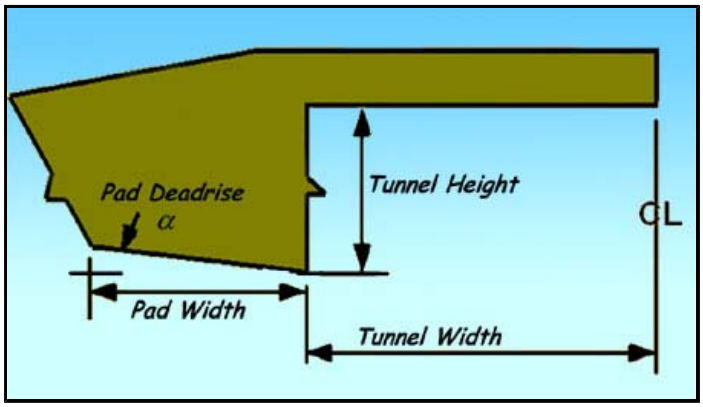
5) FEATURE: 'What a difference an inch makes" - *(Tunnel height and how it works to our performance advantage)*
.....by Jim Russell



We have countless requests to explain factors that influence the performance of tunnel boats or ModVP hulls. There are dozens of design and setup factors that impact performance, and most of them also influence each other. This makes prediction of performance a tricky business. The good news is that most of these factors are controllable (by design/setup). We rely on computers, and our "Tunnel Boat Design" software to do the work for us...but understanding the factors is the key!

One factor is Tunnel Height - this is the height of the tunnel at the aft-most location, measured from tunnel roof to the aft sponson bottoms (running pads). The "tunnel" exists in a tunnel hull, catamaran design, ModVP designs, even unlimited hydroplane boats.

The tunnel roof (lower surface) and deck (upper surface) are really surfaces that form a "wing". In applications like tunnel boats, this wing operates in what is called "close proximity ground-effect". This "wing" can generate a huge portion of the total Lift that the hull requires to perform. Research has shown that this aerofoil is influenced by it's proximity to the water surface. A lesser tunnel height will increase Lift/Drag ratio of the tunnel hull "wing",

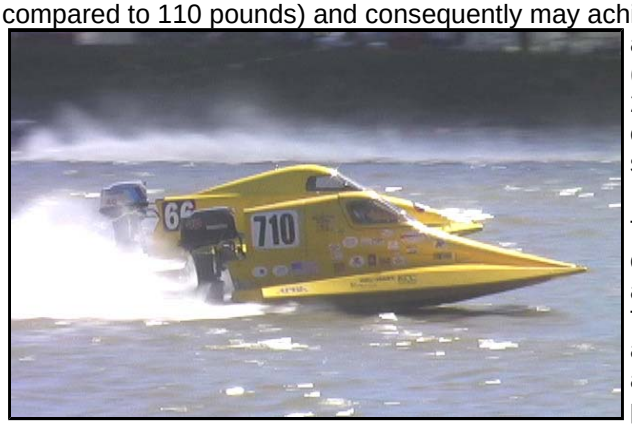
improving its lift characteristics. Regrettably, it also brings the tunnel roof closer to the water surface, risking increased wetted surface if water conditions (waves) cause "splashing" to the tunnel roof and sides. The design of this feature is, as most are, a compromise of performance factors.

Two kinds of Lift: Lift is generated in two ways. Planing sponson bottoms create 'hydrodynamic' (water) Lift. Aerodynamic lift is generated by relative air flow over the “wing” formed by the tunnel and deck surfaces. The relative significance of these forces changes as the speed increases.

At lower velocities, aerodynamic lift may account for less than 5% of total lift, sponsons supporting nearly all the boat's weight. At higher speeds aero-lift can account for over 80% of total lift. For every pound of aero-lift we can achieve, the required sponson (hydrodynamic) lift (and drag) is reduced accordingly, giving dramatic improvements in the hull’s performance. A pound of hydrodynamic Lift can be the cause of many times more associated Drag than a corresponding pound of aero Lift might cause, because of the difference in the properties of water versus air.

An Example: A 24ft offshore catamaran with 2X250hp outboards may achieve top speed of 105 mph in 26 seconds with a tunnel height (HC) of 16 inches. Changing HC to 12 inches will generate more (approx. +15%) aerodynamic Lift and top speed of 107+ mph in 22 seconds.

Another Example: A 10ft Sport racing tunnel hull with a 45hp outboard may achieve a top speed of 65mph with a tunnel height of 10 inches. Changing the height to 5 inches will generate more aerodynamic lift (225 pounds as compared to 110 pounds) and consequently may achieve a top speed of 70+ mph. And this design alternative also has the benefit of being able to operate at a reduced (trim) angle of attack (2.9 degrees instead of 2.2 degrees - 25% less), improving the dynamic balance of the hull and even a reduced tendency for porpoising at intermediate speeds.



There are always some trade-offs or performance compromises to think about when considering the design alternatives such as Tunnel Height in a performance hull. The benefit of making these assessments is that the design and performance decisions can be made on purpose - with an understanding of what we will get in the hull’s real-life performance.

And there's dozens of OTHER design factors that can influence hull performance... but, more in later issues of TBPNews!

/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 **

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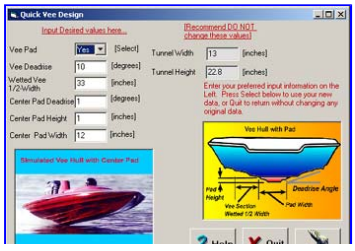
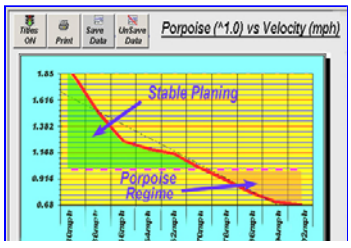
6) NEW Powerboat Design Software V7.13 Released!





NEW Version 7.13 NOW RELEASED!
BIG NEW FEATURES...YOU ASKED FOR IT...NOW TBDP© HAS IT!....
*** Full Vee Hull and Vee-Pad hull performance analysis - one-button click that changes inputs to simulate a vee bottom hull.
*** New aerodynamic algorithms.
*** Porpoise Analysis - We have developed a new

analysis tool! XPorpoise is an engineering tool developed by AR that predicts your hull's inherent susceptibility to porpoising...and shows how to fix it!
*** *User Picture import* - right onto your TBDP© data input screen!
*** 2010 Motor database, with over 960+ OEM engine specs!
*** Centerpod Wangle input - now you have the ability to represent a special angle of attack (trim angle) of the hull CenterPod that is different than the angle of the Sponsons.
*** NEW USER picture import feature.
*** New CG import feature.
*** Dozens of NEW features - including VEE HULL DESIGN software INCLUDED.
*** NEW (June 2010) - Now can select Inside Spray Rails or Outer Spray Rails or BOTH. NOW input measured Static CG of boat hull if desired (otherwise TBDP© will calculate for you).
*** NEW (March 2010) - 'Rate-of-Change' performance analysis!
*** Free Expert Analysis Reports (4) included shows how you can apply expertise to your design/setup.

...AND Lots more new great Features in V7.13 TBDP© software!

...check out the new TBDP© software V7.13 at: aeromarineresearch.com

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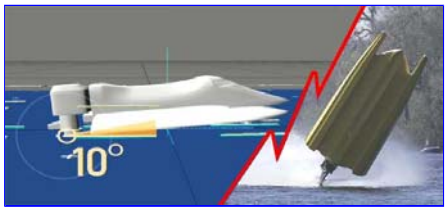
7) Powerboat Racing on TV

*** **"*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 more at AR's website! aeromarineresearch.com/NatGeo_thrill-zone.html

***** "*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

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8) Jimboat's Feature Articles

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

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 writes Feature articles in HotBoat, Family&Performance Boating, Performance Powerboat, RIB magazine, World of Powerboats, 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

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See you next time!
/Jimboat
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Let us know ideas you have, requests for articles, questions or comments on TBPNews. Send comments to TBPNews@aeromarineresearch.com
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