AeroMarine Research
TBPNews - Performance Report

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TBPNews #148- Feb 28 2012

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

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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) New engines for Formula 1 H20 boats

A new engine is to be tested at the opening round of the UIM Formula One Powerboat World Championship in Qatar on March 10 which could revolutionise inland circuit racing and provide a direct challenge to Mercury Marine.

Developed by the South African Caudwell Racing team, the engine is a 4-stroke, 3.5lt overhead camshaft unit using performance components developed by Cosworth Racing. It is claimed to be able to run as high as 8,500 rpm in race trim. Caudwell are hoping the engine provides a real challenge to the currently used Mercury Racing 2-stroke, 450 horsepower EFI engines.

It is not the first time that inshore circuit racing has eyed Cosworth in its attempt to challenge Mercury. In the mid-1970s, Jackie Wilson and Bill Brown (an early member of the Cosworth motor racing team) cleverly got round the strict outboard ruling by installing their 6-cylinder Cosworth units on detachable frames. Although competive, they weren't a match for the power-to-weight ratio of the 2-stroke outboard. But a move away from 2-stroke is now imperative. While the current 2-stroke lubrication systems are claimed to be pollution-free, some areas in Europe have imposed strict conservation rules against them.

The Union Internationale Motonautique has been keen for some time to switch to 4-stroke power and this new engine could provide the answer. "We are entering the Formula 1 series in a very respectful and professional way," said Kevin Delaney, team manager of the 4-stroke project. We realize we have a lot to learn but we expect to compete immediately and get better as the season goes along. Durability and improved environmental performance are our focus as we introduce this 4-stroke technology to the sport."

Check out more at: mby.com

and at: f1h2o.com

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2) UIM X-Cat World Powerboat Series heads to Dubai

Dubai Grand Prix, the first heat of the UIM X-Cat World Powerboat Series 2012, kicks off on the 12th January off the shores of the Dubai International Marine Club in Mina Seyahi.

Yet again, some of the top powerboat teams and racers will be joining the Series for $1 million, one of the biggest prize funds in powerboat racing. This year's line-up will be packed with experienced drivers and throttlemen from all parts of the world, providing spectators with the most breathtaking and adrenaline-fuelled racing spectacle.

Approximately 20 boats will form the 2012 grid, with back-to-back X-Cat Champions, Extreme Marine, Fazza and Spirit of Qatar being among this year's X-Cat contestants. The 2012 Calendar will consist of six heats organized in Dubai, Abu Dhabi, Khor Fakkar and Fujairah. Spectators in Dubai will be able to view the X-Cat powerboat action from the DIMC Mina Seyahi breakwater with free access, while the race will also be visible from the Palm Jumeirah close to Zabeel Saray Hotel.

The Dubai Grand Prix will start at 15:30 on Friday 13th. Official practice will take place on Thursday 12th from 14:00-16:00 and Pole Position will be judged the following day at 10:30.

UIM X-Cat World Powerboat Series 2012 Calendar
1st Heat Dubai 12th – 13th January
2nd Heat Abu Dhabi 19th – 20th January
3rd Heat Dubai 2nd – 3rd February
4th Heat Abu Dhabi 8th – 9th February
5th Heat Khor Fakkan 5th – 6th April
6th Heat Fujairah 12th – 13th April

Check out more at powerboat-world.com

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3) Great Powerboat Videos

Check out these great videos....

.....Racing F1 Onboard Videos Australia - part 1; part 2

.....Taree Australian Formula Powerboat Grand Prix

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4) FEATURE: "Why do Boats Create Rooster Tails?"

FAQ: This question comes to us from one of our readers (DS)- "Why do boats create rooster tails"?

Response: I've had many people ask me about the "lost energy" in a performance boat's roostertail. You are all right - there is a lot of energy to pump that much water into the air.

Definition: "Rooster-tail - A projected mass of fine particles of water, having an arced shape similar to that of a rooster's tail."

The rooster tail is the result of propeller hydrodynamics - the displacement of water used to generate the thrust to propel the boat forward at great speed. Present day engines can have huge power capability, and it's a challenge to transport this energy as thrust for forward motion of the boat. For example, the 200+ hp or so of engine power is converted through an outdrive to thrust of about 1300 pounds (or more) at 60 mph.

That load is pushing against the water. Some of the water just can't stay where it belongs, especially if the angle of the trim is trying to push the bow of the boat up - and hence the water at the rear up too! So this is why thrust is more efficient when the motor drive is trimmed "in", with a "thrust-line" angling down into the water.

Surfacing propellers also contribute to "rooster-tails". The surface piercing propellers run half in and half out of the water and usually display a rooster tail into the air behind the boat. While these surface-piercing props experience much less drag and are much less susceptible to cavitation, they also expel a certain amount of water "normal" to (straight up from) the water surface. Since this happens as the prop also generates forward thrust at the expense of the static water, the result is a "flow" of water up and back from the propeller.
Propeller shaft depth and thrust (trim) angle can affect the efficiency of your propeller thrust, and is often illustrated in how much of a rooster tail you see. Propeller design features also have an affect on thrust efficiency and thus, on the view of the rooster tail. Generally, however, the more "rooster tail" we see, the more INefficient is the trust.

For example, propellers designed to generate bow lift (eg: high rake) can operate to direct the "thrust cone" of your propeller to be more "narrow" or more focused. Propellers designed to be "stern lifting" can result in a "thrust cone" to be more expanded or "fat", expending energy that is not aligned with the direction of the prop shaft, and shows a more dramatic rooster tail as a result. These types of setups can have the benefit of lifting the rear of the hull and reducing overall hull drag - so the tradeoff (less efficient propeller thrust) can be worth it! Props that have very narrow thrust cones will push more of the water directly in line with the prop shaft - more efficient thrust - very little energy is thus wasted and only a small rooster tail will be visible.
Larger diameter and/or smaller pitch props can usually generate lower rooster tails - but this won't always mean better performance. It is most always, like everything in performance powerboating, a trade-off or compromise.

When you see a boat that is well rigged, well set up and well driven, the rooster tail can give it away! Often the tell-tale of great setup is NO ROOSTER TAIL! - the "spray" of rooster tail shows very little loss of energy through the lower unit and propeller setup. The hull setup is perfect for the speed he is going, and the engine trim angle is perfect to maintain hull stability and minimize power lost through generation of rooster tail. It is a picture of beauty to see a boat set up as perfectly as to see the 'perfect rooster tail'

Read more about Performance boat design and setup in the world acclaimed "Secrets of Tunnel Boat Design" book

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

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

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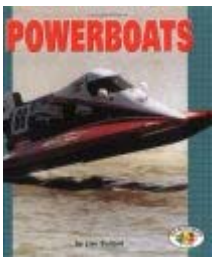
5) Discounts on Performance Powerboat Books and Magazines



Great deals on Performance Powerboat Books. Check out all of the books available on...powerboat history , boat building, powerboat racing, marine engineering, powerboat handling, powerboat design, outboard motors, aerodynamics for powerboats, hydrodynamics for powerboats, radio control boats, powerboat propellers & design, How-To for powerboating

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boating, Sport Fishing, RIB mags, Pontoon & Deck Boats. Also mags on Auto Racing, Hot Rod/Nascar, Watercraft/PWC, Waterskiing & Wakeboarding, Powerboating Industry, Yachting .

See more at: powerboatmags.com

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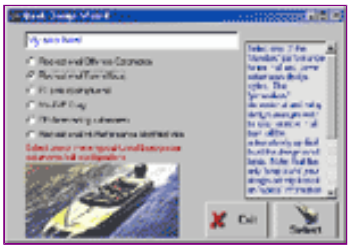
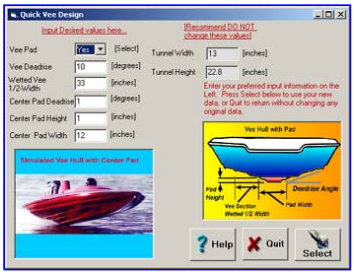
6) NEW RELEASE TBDP/VBDP SOFTWARE V7.14 software!



TBDP/VBDP© - BIG NEW FEATURES...YOU ASKED FOR IT...NOW TBDP© HAS IT!....
*** NEW 2012 OEM Motor database, with over 1200+ OEM engine specs!
*** Full Vee Hull and Vee-Pad hull performance analysis (included in one software package!)
*** 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!



*** Centerpod Wangle input - now you have the ability to represent a special 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 - 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 - '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 V7.14 TBDP© software!

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

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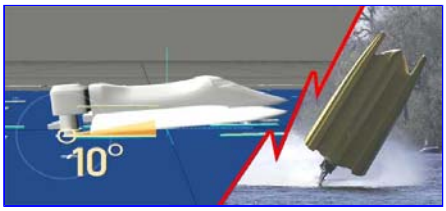
7) Powerboat Racing on TV

*** **"*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 interviews the newest up-and-coming star of 2011 F1 H20 World Championship circuit,

Shaun Torrente together with his Crew Chief Ted Gryguc.

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

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

[Jimboat writes Feature articles in 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

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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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