

AeroMarine Research

TBPNews - Performance Report

TBPNews #150- April 30 2012

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

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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) Fazza wins Fujairah - 2012 UIM X-CAT World Powerboat Series



Fujairah - Dubai's Fazza Team waged a relentless battle on the waters off the Fujairah International Marine Sports Club to clinch the top position in the final heat of the 2012 UIM X-CAT World Powerboat Series.

Pushed to the back of the eleven-boat pack for a violation on the use of fuel, the Fazza Team duo of Arif Al Zaffain and Mohammed Al Marri battled their way to the top and take their third straight win this season. The Fazza Team had started off with a win in the first race in Dubai, but ended at the back of the pack in the second one in Abu Dhabi to slip down the overall standings. But Al Zaffain and Al Marri won the next three races on the trot to finish the season with a total of 1617 points for yet another world title to their collection.

Early leaders Mouawad, with Omar Daniel and Gary Ballough at the helm, held on to second for the third time this season to finish in second overall with 1350 points, while a fourth place in Friday's race behind Extreme Marine was enough to hand the Qatar Team of Mohammed Nasr and Hamad Jasim Mohammed third overall with 1089 points.

After starting in last position, Fazza did well to stay focused and systematic in their overtaking under windy conditions prevailing on the Indian Ocean waters due to this week's tsunami warning.

Overall standings for the 2012 UIM X-CAT World Powerboat Series: 1. Fazza; 2. Mouawad; 3. Qatar Team; 4. Extreme Marine; 5. Abu Dhabi Racing Team; 6. Spirit of Abu Dhabi; 7. Consul Brokers; 8. Marine Investment Sud; 9. Westerlund Racing; 10. Insha Allah; 11. Raheeb; 12. Sky Dive Dubai; 13. Kingfisher; 14. La Vida Loca.

Check out more at: xcatracing.com

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2) Powerboats Flip on Wellington Harbour



NZ - Two offshore powerboats dramatically flipped while racing in Wellington Harbour today, with one competitor being taken to hospital.

Round 6 of the NZ Offshore Powerboat Championship featured two races run

simultaneously - a 100 mile race for the Superboat and Superboat Lite classes and a 60 mile race for the other classes. New Zealand Offshore Powerboat Racing President John McDonald said two boats had flipped during the day's racing.

The "Alimax" boat had had collided with another boat on the turn near Pt Jerningham before flipping upside down, he said.

"Everyone's back and shore nice and safe now. Both the crew from that boat are good. It was quite a mild accident really. It wasn't the initial touch that put it over....in the turn it flipped." In another incident the 19ft boat "Back 2 Bay 6" had flipped off Oriental Bay, he said. The driver of the boat had been taken to hospital after the accident.

Check out more at dompost.co.nz

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3) Great Powerboat Videos



Check out these great videos....

.....[Interview Shaun Torrente, from USA, Team Qatar after his 4th place in the Grand Prix of Qatar, Doha.](#)

.....[World Record Breaking run during the 2010 Coniston Records Week](#)

.....[World's Fastest Pontoon Boat?](#)

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4) FEATURE: "Can Sport Tunnels (& Modified Vees) Blow Over?"



Analysis and proper design of a high performance tunnel hull is a tricky balance of aerodynamic 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.

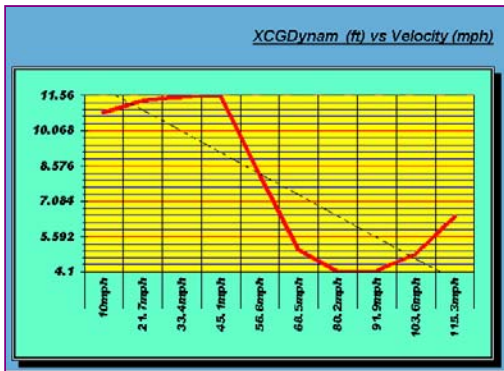
How much Lift? - One of the questions raised by our readers is... "*does anyone know how much aerodynamic lift these boats generate, and at what speeds?*" These types of hulls are quite good at generating aerodynamic lift. The lift is generated by the ground effect of the aerofoil (wing section and tunnel 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 30% of total lift at this speed. The angle of attack at high speeds is usually optimum ("best" Lift versus Drag) at 1.6 to 1.9 degrees.

You can't balance on the Trailer - Another point made by readers is that of explaining "*changing lift characteristics as the sport tunnel accelerates through its speed range*". The location of all the 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 a lot of moving around for the "balance" of the hull - and it's typical. 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 "hump") at about 55 mph, when the aerodynamic forces start becoming more important as compared to the other acting forces. In this case, we can define the stability measure as the change in the location of the XPRESS (aerodynamic center).



From analysis of the test hull (same as most all tunnels, by the way) we will 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.

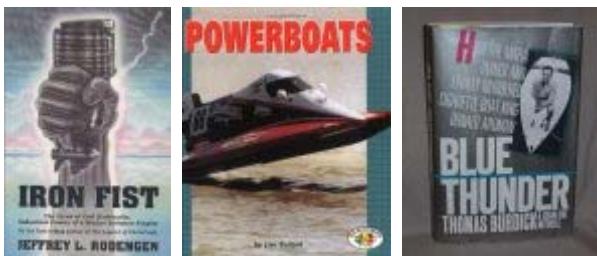
See more Performance Articles at: <http://www.aeromarineresearch.com/articles.html>

Read more about Performance boat design and setup in the world acclaimed "[Secrets of Tunnel Boat Design](#)" book

[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) 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

See more at: powerboatbooks.com

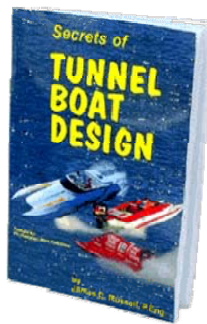


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See more at: powerboatmags.com

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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.

These new segments are added to the original 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 includes:

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

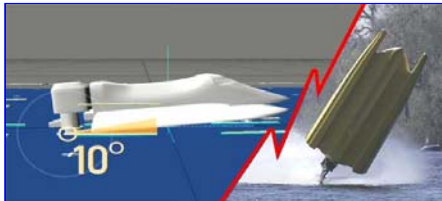
[Buy Now](#)

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

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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 POWERBOAT & RIB magazine!

