AeroMarine Research
TBPNews - Performance Report

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TBPNews #158-Feb 20, 2013

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

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In this issue:

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

1) Mercury 1650 Race Engine Unveiled

Some of you may be aware of the rumor mill started a while back when Powerboat Nation posted a story speculating we were going to release a 1700 h.p. engine. The story featured a dated 1350 model shot. Erik squashed all rumors when he unveiled the all-new 1650 RACE sterndrive. Based on our exclusive quad cam, four valve 1350, this monster features new pistons, larger turbos and requires 112 AKI race fuel.

So there, PB Nation. You were correct in that – yes – we did release a higher power engine based on our exclusive quad cam, four valve engine platform. You were off on the power and color, however. And no, this is not your father's poker run engine. It is a race engine that is sold, without warranty, to qualified powerboat racing professionals.

Read more at: mercuryracing.com

ant more at: powerboatnation.com

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2) AMG and Cigarette Racing produce the world's fastest and most powerful electric boat

Mercedes-AMG and Cigarette Racing have launched their latest collaboration at the Miami International Boat Show. The 38-foot Top Gun Cigarette Racing hull is powered by an AMG electric drive pumping out 2,220 horsepower (1,656 kW) and 2,210 ft-lb (3,000 Nm) of torque for a top speed in excess of 100 mph (160 km/h or over 86 knots). The electrics are taken

nearly whole from the SLS AMG Coupé Electric Drive – the world's fastest and most powerful production electric car.

Having chosen the Coupé Electric Drive as the inspiration for the AMGCR collaborative project, the design team selected the Cigarette Racing Top Gun as the platform upon which to build an insane electric racing boat. The Top Gun is a classic cigarette boat that's been a staple of the Cigarette Racing Team for over 25 years. With a length of 37.5-feet, an 8-foot beam, and a static draft of 27-inches, your classic Top Gun is available with a pair of Mercury Racing 600 SCi inboard engines providing a total of 1,200 hp (894 kW) of pure power, easily pushing the boat into triple-digit speed.

Apparently deciding that anything worth doing is worth overdoing, AMGCR put not four, not eight, but twelve of the AMG electric motors into the new Top Gun. The boat's drive is organized around a pair of prop shafts, so AMGCR tied the motors into two clusters of six motors each, as shown above. Each cluster weighs some 600 lbs (272 kg), which saves some weight by replacing a gasoline engine weighing 1,267 lbs (575 kg). Each of the two electric motor clusters generates 1,110 hp (828 kW), putting the gasoline-powered Top Gun to shame.The mounting of the motors and battery packs lowers the center of gravity of the Electric Top Gun, which results in a very well-behaved go-fast boat

When running full-tilt, the two electric motor clusters eat a prodigious 2.4 megawatts of electric power - roughly the power requirements of a small town. This means that the batteries can only provide full power for about ten minutes. When corrected for the energy efficiency difference between electric motors and gasoline engines, the full energy capacity of the Electric Top Gun's battery pack is equivalent to about 15 gallons (56 l) of gasoline.

The AMGCR Top Gun Electric Drive is a remarkably successful design effort, which is perhaps as impressive a technology demonstrator as has appeared in boating in recent years.

Check out more at gizmag.com

and at: cigaretteracing.com

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3) Powerboat P1 USA launches P1 AquaX Jet Ski Series in the Unites States

Powerboat P1 USA launches P1 AquaX Jet Ski Series in the Unites States

Powerboat P1 USA, a wholly owned subsidiary of London-based powerboat racing promoter Powerboat P1 Management Ltd., today announced the launch of a revolutionary personal watercraft race series, P1 AquaX (pronounced Aqua Cross). The AquaX events will run alongside the 2013 P1 SuperStock USA Championship at high-profile venues in Florida, including Daytona Beach, Pahokee, Cocoa Beach and Marathon.

AquaX is an exciting series that offers a completely new experience for personal watercraft enthusiasts by offering top-class entertainment for both spectators and competitors. It is a market-driven championship which has run alongside SuperStock powerboat racing in the UK for the past two years and bridges the gap between leisure use and racing by taking riders onto the open sea. Specifically designed to attract amateur riders to enter the sport, this unique series offers competitors a hugely exciting challenge and the opportunity to win a slice of an impressive $15,000 potential prize purse depending upon entry numbers, with the Elite and both Amateur class riders each having an equal chance to pocket some prize money.

AquaX is open to all types of watercraft, with Yamaha, Kawasaki and BRP (Sea-Doo) models expected to race unmodified in three classes: 200, 250 and 300hp. Riders will earn 10 points for a superpole victory and 20 points for race win. Running at the same time, the AquaX Cup is open to all, including those with modified craft falling outside the standard class structure, who want to experience the thrill of racing. The Cup is not a Championship class, so

points or prize money will not be awarded. Its purpose is to acknowledge the overall winner of the race at each individual round. Each two-day AquaX event will consist of three races: Superpole, a shorter qualifying race followed by two rallies where the focus switches to endurance riding and stamina over longer distances. The race tracks are wide open yet simple to navigate, and will be patrolled by trained race marshals to ensure safety at all times.

Much like the P1 SuperStock powerboat racing series, AquaX is designed to provide an accessible and affordable platform for motorsport enthusiasts and to help develop the sport of watercraft racing from the ground up. The 2013 AquaX Championship Classes are as follows:
• AquaX 200 - modified 2-stroke and stock naturally aspirated 4-stroke 160bhp and below.
• AquaX 250 - stock 4-stroke including turbo/supercharged 250bhp and below.
• AquaX 300 - stock 4-stroke including turbo/supercharged 300bhp and below.
• AquaX Cup – Open.

For more information, go to: p1aquax.com

and at: bymnews.com

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4) Great Powerboat Videos

Check out these great videos....

.....Big Waves and Cigarette Boats

.....Rupp Temper - Worldspeed record attempt in Norway for the UIM F2

.....Tai longtail boat racing video

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5) FEATURE: "We Know Jack" - Move Your Outboard Up & Out With a Jack Plate To Increase Performance

...by Jim Russell

To get the most from your performance powerboat setup, your outboard motor placement can be just as important as horsepower and propeller selection. Manual and power Lift and setback jack plates have made the fine tuning of high performance powerboats an uncomplicated reality for everyone.

Jack plates and setback brackets are fundamental to every performance boater's goal to achieve the most of his setup. There was a time in the 1970s when these jacks and setbacks were limited to racing teams. Now, many performance boats come equipped with jack plates or owners can easily add them to their package.

Jack plates give you the ability to raise or lower your outboard without having to remove transom bolts and allow you to fine-tune engine height for maximum performance. If you have a power hydraulic jack plate you can adjust engine height while under way, for varying speed requirements, water conditions or shallow water runs. Usually jack plates will add top-end speed, enhance hole shot (acceleration) and improve handling. They can improve fuel economy, increase propeller clearance, and get your hull on plane faster. We can see that there are many performance benefits of adding a jack plate. Here is some info, considerations and alternatives – so that we all will really DO Know Jack!

Here is the Setback - Jack plates also provide setback - the ability to move the engine farther aft of the transom.

This can appreciably modify the dynamic balance of your boat, which for some hulls/setups, can make it easier to get on plane, achieve a better angle of attack (trim) and help attain higher top speed, better acceleration and better hole shot. Even without a jack plate, a setback bracket can do the same thing (without the ability for height adjustment).

So, when will a boat benefit from a jack plate? There's no single "rule of thumb" that will 'always' improve performance, but performance vee hulls with pad bottoms or notched transoms and tunnel hulls or modified vee hulls can often benefit from adding a jack plate. Moving the engine back a bit changes the boat's (dynamic) center of gravity, making it easier to lift the bow, so a boat that is bow-heavy will show a benefit from a jack plate that provides setback.

More setback isn't always better. The Cook Mfg (CMC) experts suggest that for many boats their 5.5 inches setback model is the perfect amount. Plates with more setback (8 and 10-inch setbacks) are primarily for bigger hulls and boats that are bow heavy. It is always a good idea to ask your boat's manufacturer which set back they recommend for your setup.

Engine Height can really be a Drag! - The hydraulic drag generated by the motor lower unit can make or break your hulls performance. If you can raise the motor higher, so that there is less lower unit in the water, then there is less drag – and more speed! The thrust that propels your hull is most efficient when if is aimed exactly in direction of boat – so motor trim angles of 1 degree up or 1 degree down can hurt performance. Adjusting the height of the motor (lower unit) has a big influence on total hydrodynamic drag. In an outboard, this is often done with a manual or hydraulic jack plate.

Avoid Blowout - If your engine is positioned too high on the transom, the propeller may not generate sufficient lift for the boat. This usually requires that the driver then apply excessive trim angle (out). This causes the direction of thrust of the propeller (shaft) to be less than optimum - inclined downward instead of aligned exactly in the direction of motion (parallel to the water surface). This is bad for the propeller and inefficient for the boat performance. Designing your boat setup with the engine at the optimum height will help overall performance. Your adjustable jack plate makes it easy for you to get just the right engine height to maximize performance and minimize blowout.

Manual Jack or Hydraulic Power Jack?- There are 2 different kinds of jack plates: hydraulically operated and manually operated. The hydraulic transom jack plate is the "ultimate" in jack plates. This unit mounts between your transom and your outboard motor and moves the motor either up or down with the push of a button from the helm. The hydraulically operated transom jack can be installed with a position indicator so you can tell the height of your motor without having to bring it all the way up or down. The power jack plate can be adjusted while you are underway, even at full speed.

The manual jack plate makes it easier to move your outboard motor up and down – usually by just turning one or two adjustment bolts or nuts, and without having to remove motor attachment bolts or use an engine hoist. The main difference with the manual jack is that you must be stopped to adjust the height of your motor.

A manual plate can be a good choice if the boat doesn't need help getting on plane and if fine-tuning the height at various speeds isn't a primary goal. Manual jacks have bolts that lock the setup at your specified height and won't move under bumps or stresses. Hydraulic units, no matter how well constructed, can move a little while under way since they are intended to be adjustable, moving on either slide bearings or bushings. Heavy or underpowered hulls that need more thrust to get up to plane can benefit from a power electric/hydraulic jack that lets you lower the engine for less propeller slip during hole shot, and then raise it to reduce drag and increase performance at higher speeds. Manual jacks, of course, cannot provide this benefit while under way. The down side to hydraulic units is cost, maintenance and possible repairs due to the increased complexity. Most manual units sell for about half the cost of a power hydraulic jack plate.

Where to Go: - There are several major manufacturers of manual and hydraulic jack plates for recreational and competitive performance powerboat market. There is even a product for multiple engine setups. (Bob's Machine Shop has the "Double Jac™" that can lift twin outboard engines at the same time with one pump). A few top suppliers include: CMC - Cook Manufacturing (www.cmcmarineproducts.com); Bob's Machine Shop (www.bobsmachine.com); Detwiler Industries (www.teleflexmarine.com); T-H Marine (www.thmarine.com); Vance Manufacturing (www.vancemfg.com).

What to consider - Features to consider when you are selecting a jack plate…
• Additional weight of the plate and pump (35lbs to 90lbs)
• Manual plate or powered hydraulic rig?
• Location of the hydraulic pump (integrated into the jack plate or remotely mounted inside the boat?
• How much setback?
• Amount of plate travel height (up/down)
• Speed of plate motion (up/down).

The speed of up/down motion of a jack plate should not be too fast for high speed driving. If the motor moves up too fast when you press the remote button, then you can miss the sweet spot. Race hulls are often set up with 20-30 inches per minute of stroke speed.

It's a good idea to also install a dash-mounted height gauge, so that when you've found the perfect engine position for a performance situation, you can go to it again by easily repeating the setup. Remember that as you raise the engine height, your water intake holes get higher too, so a low water pickup may become necessary in order to ensure that the engine gets enough water pressure. A water temperature or pressure gauge is always a good idea.

There are some good performance benefits to be gained by adding a jack plate to your boat setup. As with all performance powerboat design and setup opportunities – there are alternatives to consider so that you get the most for your hull and operating conditions. It's easy to make the best decisions when we're well informed – and now we all will really DO Know Jack!

/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

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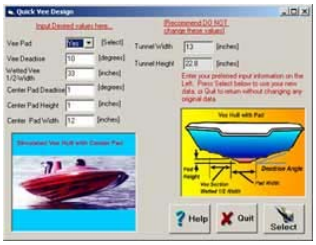
6) *NEW!* Tunnel Boat Design Program software, Version 7.15 RELEASED! - Jan 01, 2013

NEW Release of Tunnel Boat Design Program software. NEW Release (Jan 01, 2013 includes Vee Boat Design Program (VBDP) in the same package, with all the other great feature upgrades!

Check out the new TBDP performance software V7.15 at:
aeromarineresearch.com/tbdp6.html

And... check out the new VBDP performance software V7.15 at:
aeromarineresearch.com/vbdp.html

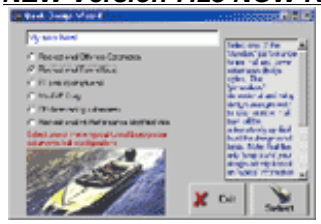
The Tunnel Boat Design Program (TBDP/VBDP) software makes performance analysis and design, fast and simple for all types of tunnel hulls, power catamarans, modified tunnels, vee hulls and vee-pad hulls.



The NEW TBDP and VBDP incorporates the same ("AR Analysis") design approach as documented in the Secrets of Tunnel Boat Design book. The super power of the software allows for even more comprehensive analysis, employing engineering techniques that include detailed aerodynamic, hydrodynamic and stability calculation methods that are key to proper Tunnel hull design and accurate performance prediction. TBDP/VBDP is a high performance software, but it's not just for high performance applications. Great for recreational, commercial, fishing, high performance and racing tunnels, powercats and vee hulls (even whitewater jet hulls, RC boats, Fishing/Utility tunnels, modified tunnel (Mod-VP), modified Vee hulls, bass boats) - and NOW for Vee

hulls & Vee-Pad hull designs!

NEW Version 7.15 NOW RELEASED!



Accurate Performance Prediction through full velocity range; Dynamic Stability Analysis; Hull design optimization.
BIG NEW FEATURES...YOU ASKED FOR IT...NOW WE'VE GOT IT!
This is the ONLY software specifically for design, performance analysis and setup of tunnel hulls and performance Vee hulls!
*** New Performance Summary Wizard with key indicators and recommendations! Optimization of hull design features. New aerodynamic algorithms. NEW USER picture import feature. New CG import feature. Dozens of NEW features - including VEE HULL DESIGN software INCLUDED.
*** Vee Hull Design Feature - full Vee Hull & Vee-Pad Hull design & performance analysis.
*** Porpoise Analysis - NEW TBDP V7 BREAKTHROUGH FEATURE! - New analysis tool! XPorpoise is an engineering tool developed by AR that predicts your hull's inherent susceptibility to instabilities that lead to porpoising.

see more on the TBDP/VBDP features here.

Buy Now

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7) Powerboat Racing on TV

***** "AMSOIL Offshore Powerboat Series"** - Check out TV Schedule on Fox Sports Net
***** "*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
*** **"P1 Powerboat World Championship"** - See at: www.boatson.tv

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8) Jimboat's Feature Articles

NEW - Author Jim Russell outlines secrets of 'Outboard Jack Plates for Performance in Powerboats'

Jimboat outlines secrets of 'Step Design in Powerboats'

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, Scream&Fly magazine,

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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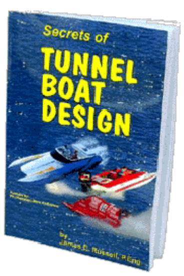

Get your full, illustrated, *13th edition* copy of the world acclaimed "Secrets of Tunnel Boat Design" book;
"History of Tunnel Boat Design" book, "Secrets of Propeller Design" book, the "Tunnel Boat Design" software
for tunnel and high-performance Vee-hull design, and "PropWorks2" software for speed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