

AeroMarine Research

TBPNews - Performance Report

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**TBPNews #151- May 31 2012**  
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>>>> **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) Hydroplane innovator, owner Fred Leland dies



Fred Leland was all about giving people chances, whether you were a new driver or a crew member looking to get started in the sport of unlimited hydroplane racing.

It wasn't beneath him to give other teams a piece or two of equipment during a race weekend, just so that team could still race and his team could still kick their butts. His normal operating procedure at Tri-City hydroplane races was to bring at least two boats, sometimes three, to make sure the boat count was up. He could also be gruff and cut someone off at the knees if he got his dander up. But underneath that gruff exterior was a man who cared about the people in boat

racing and the fans who loved it. And now he's gone.

Leland died Sunday (May 20, 2012), losing his five-year battle with lung cancer at his Kirkland home. He was 74. "They broke the mold on that one," said driver Mark Evans, who raced for Leland during the 1990s and now has his own boat for the upcoming season.

His team, Leland Unlimited, won 17 races, including two Gold Cups, and a national championship. He also enjoyed building boats, and the creativity is what he liked most. "I like the racing aspect of things and building the boats," he said. "You do have to make everything yourself". At least six other teams have used his hull design for their boats.

Leland knew his time was coming, but it's been reported that he wanted to keep his boats running through at least this coming season. His long-time driver, Greg Hopp, will oversee the program this season. "Fred will be sorely missed," Hopp said on Facebook on Monday night. "He has touched everyone in this sport at some point, and had the biggest heart in the world."

Read more here: tri-cityherald.com

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2) Mercury Sweeps Rouen 2012!



The 49th annual 24 Hours of Rouen endurance powerboat race concluded 4 p.m. Rouen, France time Monday, May 28. This year, Mercury dominated the event - powering the top nine finishers.

Mercury powered the top five in Class 3 (mostly Mercury S3000 race engines with a sprinkling of Evinrudes). Merc owned all of Class 2 (OptiMax 200XS SST or SST 120 power). The fourstroke Mercury's swept the top four in Class 1 competition (Mercury, Honda and Yamaha brands).

The international all-female entry Olympic Team Rouennais (with Canadian Tammy Wolf) finished a respectable 4th in Class 2 and 9th overall.

Rouen 2012 was historic on many fronts:

- 1) This was the first time in recent history the race start date was changed from April 30. It was the second consecutive year the race was not run continuously for 24 hours. This year the race was stretched out to three days, with six hours of racing on Saturday, May 26; 12 hours of racing on Sunday, May 27; and the final six hours run on Monday, May 28. Racing began 3:30 p.m. local time Saturday, May 26 and ran until 9:30 p.m. Racing convened at 9:30 a.m. Sunday, May 27 and ran until 9:30 p.m. Racing convened again 10:00 a.m. Monday with a 4 pm finish.
- 2) This year also marked the first time in history an International All-Female team (Olympic Team Rouennais #24) competed in the event.
- 3) 2012 was the first time a Mercury fourstroke won Class 1 which has historically favored 2-stroke Yamahas.

Team Pegase Humanis #8, a Mercury S3000 race outboard-powered Moore hull won the race overall and Class 3 competition. Drivers Christophe Boyard, Xavier Savin and R. Avenel completed 730 laps, 30 laps ahead of Drakkar #2. All were powered by Mercury S3000 race outboards.



Reigning Class 2 champion Team Dailly Inshore Passion #36 completed 593 laps, one ahead of Neptune Inshore #34 to capture their second consecutive Class 2 victory and a respectable sixth place overall. Dailly Inshore Passion #35, Olympic Team Rouennais #24 and Marine Inshore #28 rounded out the top four in Class 2 and 6-9th place overall with Mercury OptiMax power.

In Class 1, Mercury 60 EFI Formula Race outboards have competed in Rouen for some time. This year, Vallee de Seine drivers Oli Letellier, Jer Amedee and Thomas Cleret completed 412 laps to capture the checkered flag and place

Mercury in the record books as the first Mercury fourstroke outboard to win Class 1. All were powered by Mercury 60 EFI FormulaRace outboards.

It's hard to believe Rouen turns 50 next year. It would be wonderful to celebrate it's golden anniversary by racing a continuous 24 hours. Just like the good ol' days.

Check out more at mercuryracing.com

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3) Great Powerboat Videos



Check out these great videos....

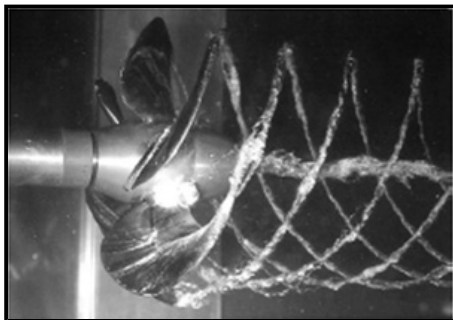
.....[Tunnel Boat Crashes](#)

.....[18hp Tunnel Boat Race](#)

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4) FEATURE: "What a Blowout!" - Gearcase/Propeller Blowout causes and cures.

We have received many questions about the cause and effects of "blow-out". Here is an explanation of Blowout and causes...and some cures...



Most all high-performance boaters have experienced the circumstance that restricts their maximum velocity to less than it could be, even though they've got the horsepower available to use. This phenomenon is commonly called "gearcase blowout" or "propeller blowout".

Blowout occurs when something causes air/water mixture in the region of the propeller to become sufficiently disturbed that the propeller cannot continue working in "clean" water, but is rather, trying to work through a very soft or light mixture (or a relative vacuum). This causes the propeller efficiency to significantly fall off, (seems to lose thrust) and triggers a typically dramatic hull performance behaviour. These behaviors can vary from a feeling of "loose" steering to a nasty turn (typically to the

right). The velocity at which "blowout" takes place depends on boat design, hull setup, lower unit design, propeller design, and driving style.

The main contributors to blowout are:

Motor height:

If the engine is positioned too high, the propeller may not generate sufficient lift for the boat. This usually requires that the driver then apply excessive trim (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 trim angle is thus forcing an inefficient profile to the hydrodynamic flow around the lower unit (more drag) and the propeller (inefficient lift). Designing the hull and the boat setup with the engine at the optimum height will help overall performance.

Using a jack plate will make these engine adjustments much easier. This is easiest to do with a hydraulic jack plate, but a manual jack plate will provide the same range of adjustment needed. [Remember that as you raise the engine height, a low water pickup may become necessary in order to ensure that the engine gets enough water pressure.] Often, as the engine is raised on the transom, the reduced lower unit drag can allow for a different trim angle to be applied, resulting in an improved effect on the speed of "onset of blowout".

Gear case condition:

If the gear case has been damaged (tagged any logs or rocks lately?); or has an improperly installed nosecone; or a damaged skeg; the gear case cannot maintain the intended hydrodynamic direction (steering). The impact can be the desire (need) for the gear case to "crab" through the water, creating an area void of pure water, like an air pocket where the propeller is now trying to perform its duty. This is bad news for the propeller - it needs water to work properly. Cleaning up all the scratches, scrapes, nicks and gouges in the gear case so that it is very smooth will improve performance. Don't underestimate the possible significance of this operation - the smallest and seemingly trivial defects in the gear case surfaces can trip the "onset of blowout"!

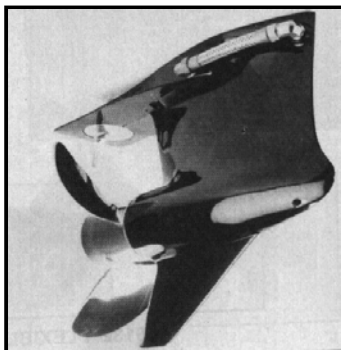
Hull Design:

Some hull designs are more susceptible to "blowout" than others. There are no "rules" for how to design for "no blowout", since there are so many operating and performance issues that the designer must consider. It's difficult to merely "look" at your boat to determine whether it might be susceptible to "premature onset of blowout" or not. The well-designed hull will have a dynamically balanced performance through all operating speeds. The inherently unstable hull will need more effort with "on the water" set-up. Weight distribution, engine positioning, bottom cleanliness are some features that can be altered, if need be, after the boat is diagnosed with problems. The hull that is dynamically stable throughout its uppermost velocity range can reduce the tendency for blowout and lessen the otherwise dramatic effects of blowout.

Velocity:

Once a stock gear case is asked to go faster than it's original design speed, water separates from the leading edge of the bullet and upsets the flow around the propeller. In engineering terms, this is a disturbed flow, and when this occurs near the propeller, it really impacts the propeller's performance and efficiency. Smaller gear cases with smaller, aerodynamic bullets will always improve this situation, delaying "blowout" tendencies to a higher velocity. Adding a nosecone can also increase the velocity (delay the onset of blowout) that a standard gear case can operate effectively (more on nosecones later).

The cause of blowout is generally a combination of all of these sources. Gear case modifications and propeller changes can reduce your chance of blowout or reduce the tendencies for blowout, or delay the onset of blowout (velocity). A properly designed and dynamically balanced hull also helps the blowout situation. The reality of high performance powerboating is, however, that as you strive for the maximum performance of your setup, blowout is often just piece of the business, so you will experience it eventually.



Nose-cone technology - As water flows by the lower unit and begins to separate from the unit at higher speeds, a turbulent flow condition or "vortex" causes a lower pressure behind the gear case. This lower pressure increases the drag of the lower unit. A by-product of the air/water mixture and the water separation from the gearcase surfaces is propeller burning. This phenomenon leads to blow-out, and can also reduce top speed before blow-out is obtained. By increasing the length of the "bullet" on the lower unit, the hydrodynamic aspect ratio (length to diameter ratio) of the bullet is increased (improved), providing superior water flow characteristics and delaying the onset of propeller burn and blowout. A well-designed nose cone can delay the speed at which blow-out occurs and improve propeller efficiency.

Cavitation is not Blowout - but we always get it! Cavitation is "*the sudden formation and collapse of low-pressure bubbles in liquids in regions of very low pressure or regions that are subjected to rapid or intense pressure changes*".

The design of a gearcase is a compromise hydrodynamically. Irregularities on the outside surfaces of the gearcase such as fill holes, drain holes, water vents, etc. create a disturbance of the flow and can cause cavitation as the speed of the boat increases.

You might not even have "Blowout" - Very few boats run into a "total" blow-out situation...more often the setups encounter "propeller burn" - a phenomenon that occurs prior to blow-out. Many high performance boaters may be experience propeller burn and not even be aware of it. You may have noticed pitting on your propeller blades caused by this propeller burn. The addition of a nose cone can reduce or even eliminate propeller burn, blow-out, and allow you to improve your speed if the horsepower is available.

When blowout does occur, the propeller breaks loose completely and cannot recover until the boat is slowed down enough to allow water to re-enter the propeller void created by the ventilation occurrence.

Blowout can sneak up on you! - Classically, just prior to encountering a blowout you will experience a "loose" steering feeling, an RPM increase without any speed increase, a loss of lift, and a resulting drop of the bow of the boat. When all of these happen quickly, it can be a hair-raising incident! With experience, you can learn to sense when you are approaching the onset of "blowout" - so pay close attention, take appropriate actions, always wear your PFD - and hold on!

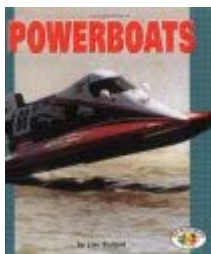
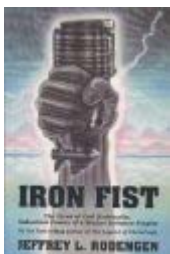
See more Performance Articles at: aeromarineresearch.com/articles.html

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

[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

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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

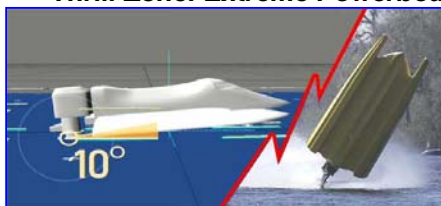
[Buy Now](#)

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

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BY MICHAEL KROGER @michaelkroger

TUNNEL VISION:

HOW DOES A TUNNEL BOAT FLY? PART 2

BY JIM HUSSELL
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The tunnel boat is a unique and exciting watercraft that has gained popularity in recent years. It is a small, narrow boat that is designed to travel through narrow channels and tunnels. The boat is powered by a single outboard motor and is capable of reaching speeds of up to 30 miles per hour. The boat is also very maneuverable and can be used for a variety of purposes, including racing, recreation, and transportation.

One of the most interesting features of the tunnel boat is its ability to travel through narrow channels and tunnels. This is made possible by the boat's unique design, which allows it to fit through spaces that are only slightly wider than the boat itself. This makes the tunnel boat a popular choice for racing and recreation in areas with narrow waterways.

Another interesting feature of the tunnel boat is its speed. The boat is powered by a single outboard motor and is capable of reaching speeds of up to 30 miles per hour. This makes it a popular choice for racing and recreation.

The tunnel boat is also very maneuverable and can be used for a variety of purposes, including racing, recreation, and transportation. This makes it a popular choice for many people who are looking for a unique and exciting watercraft.

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 interviews in RaceBoat International magazine, the newest up-and-coming star of F1 H2O World Championship circuit, Shaun Torrente together with his Crew Chief Ted Gryqc.

- [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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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>