AeroMarine Research
TBPNews - Performance Report

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TBPNews #101 – June 14, 2006

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>>>> **Tunnel Boat Performance News** >>>>>> (over 7000 members!)

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

1) New Safety Seat From Seebold Racing

The UIM crash boxes that the UIM propose to make mandatory in 2007 are under discussion in Portimao, Portugal prior to the F1 Portuguese GP.

It appears the reinforced moldings that are to be fitted to the sides of Formula catamarans cockpit cells are not everyone's ideal choice. DAC have fitted crash boxes on a prototype boat and report the extra weight does not unduly effect performance. Nevertheless, the UIM instructed a German company to design and produce a crash box, and we understand builders and drivers were then told, they had to pay to acquire the design etc. before they could produce two of these boxes.

However Seebold Racing of the USA have been developing a viable alternative to composite crash boxes.... a reinforced seat. The high-impact material being used has been extensively tested on Indy Cars and has proven very effective. In terms of weight is comes in at around 6 pounds. Although we have yet to received pictures or specification, basically it's using a tried and tested formula of filling a bean bag type container with molecules and resin and the driver sits in the seat and it takes shape around his back, head, legs etc and the sides are considerably higher than the standard seat. The difference with the Seebold seat is that it uses new, high-tech material developed in the aeronautic industry that will absorb a huge impact without breaking. As soon as we have details of the final specifications and prices we will reproduce them on our site. The big question is, will the UIM insists builders and drivers use their invention as opposed to giving an option of choice?

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2) Feature Article "Can Sport Tunnels (& Modified Vees) Blow Over?"

Analysis and proper design of a high performance tunnel hull is a tricky balance of aero 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©" to do the analysis, since it has features that make "tuning" the analysis easy for top speed, acceleration and/or stability simulation.

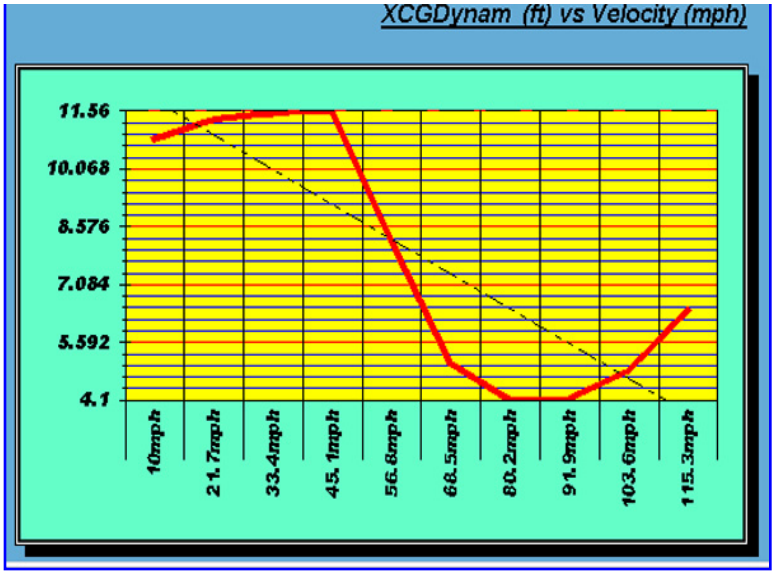
How much Lift? - One of the questions raised by our readers is... "does anyone know how much aerodynamic lift these boats generate, and at what speeds?" These types of hulls are quite good at generating aerodynamic lift. The lift is generated by the ground effect of the aerofoil (wing section and tunnel roof) operating in close proximity to the water surface. In our example boat, the aerodynamic lift generated is about 60lb @ 40 mph; 311 @ 87 mph; 413 lb @ 100 mph. This is probably as much as 28% of total lift at this speed. The angle of attack at high speeds is optimum at 1.6 to 1.9 degrees.

You can't balance on the Trailer - Another point made by readers is that of changing lift characteristics as the sport tunnel accelerates through its speed range. The location of 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 specific speed*". The phenomenon that is 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). 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).

Well, this (example hull) design, like most tunnels of this size, sees its inherent instability (referred to as the "porpoising hump") at about 55 mph, when the aerodynamic forces start becoming more important. In this case, we can define the stability measure as the change in the location of the XPRESS.

From analysis of the test hull (same as most all



tunnels, by the way) we can 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
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3) Clayton Antique Race Boat Regatta expands to four days

August 17-20, 2006 - Clayton is the birthplace of the APBA Vintage & Historic Division. It is where the first antique boat regatta was held in 1992, and Clayton continues to be the biggest event on the APBA Vintage Race Boat Circuit. With this summer's regatta at four full days and with additional docking, well over 150 vintage race boats are expected. Displayed for all to admire, they will also be running demonstration laps on a course set up in front of the Museum. Clayton will be THE Vintage event this summer - so mark your calendars now for August 17-20th.

Visit http://www.vintageraceboatshop.com/Clayton2006.htm for more info.
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4) Boat Race announced in Newport

NEWPORT – Powerboat racing is returning to the Ohio River in July, Champ Boat Racing Series officials announced today at Hooters restaurant. Newport will host the second straight Greater Cincinnati Champ Boat Grand Prix July 15 and 16. The free event, which attracted 40,000 spectators last year, features 17-foot Formula One powerboats with 350 horsepower that accelerate to 140 miles per hour. Drivers in three classes (the pro class and two lower classes) will race a 1.2-mile loop. The Grand Prix is the second stop in the North American Tour.
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5) 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...Wednesday, July 19, 8:00PM; Thursday, July 20, 3:00AM; and Saturday, July 22, 4:00P

Details at: (http://channel.nationalgeographic.com/channel/ET/daily/20060719.html)

Watch for other show dates on AR's website! http://www.aeromarineresearch.com/NatGeo_thrill-zone.html
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6) Henry Lauterbach, Champion Hydroplane Driver, Dies at 87

June 3, 2006; PORTSMOUTH - Henry Lauterbach, champion hydroplane driver in the 1950s who won five national titles in three years and went on to build more than 200 of the handcrafted speedboats, died of heart failure. He was 87.

Lauterbach grew up in Portsmouth and Newport News, and was among the best at driving and designing hydroplane hulls. His "Lauterbachs" dominated the race circuit for decades and became as much works of art as they were known for competitive racing. Lauterbach, was selected for the American Power Boat Association's exclusive "Honor Squadron" in 1974, and he was inducted into the Virginia Sports Hall of Fame in 1999.

Even with health problems in recent years, the white-haired master builder still drove his pickup to his shop in Suffolk, where he crafted and restored custom hydroplanes for some of the sport's premier drivers.

Lauterbach could be charming as well as stubborn, and he had a quick, incisive sense of humor. Once, as a story is told, a customer complained that his new hydroplane was not performing as it should. Lauterbach, knowing the boat was in perfect shape, asking, "Does the boat float? Does the motor run? "That leaves only one thing - take a look at the driver."

Check out more info on Henry Lauterbach at:
Vintage Hydroplanes web site
http://www.lauterbachboats.com/
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7) Jimboat's Feature articles

Jimboat writes Feature articles in HotBoat and Family&Performance Boating magazines.

- '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" - HB-Aug2004

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See you next time!
/Jimboat
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