WHAT'S DRIVING YOUR BOAT?

SINCE THEIR INTRODUCTION IN 1959, MARINE TRANSMISSIONS HAVE TRANSFORMED THE WAY POWERBOATS OF ALL SHAPES AND SIZES HAVE BEEN DRIVEN. LOOKING BACK IN TIME PADDLE DRIVEN VESSELS WERE THE POPULAR CHOICE FOLLOWED BY SHAFT AND PROPELLER. *WORDS: DAVID SEWELL*

During the First World War, MAS of Italian giant Isotta Francchini produced a unit which boasted counter-rotating props, a unique system at that time. However it was not until 1959 that today's version of the sterndrive was born and in rather unusual circumstances. UIM Senior Vice President Charlie Strang who was a 'big wig' in Mercury Marine at the time, and engineering wizard Jim Wynne who also worked for Mercury had produced a pioneering sterndrive but Mercury boss Carl Kiekhaefer was unimpressed with their efforts. In 1958, a disgruntled Wynne left Mercury, 90 days after Keikhaefer's decision, went to Volvo Penta in Sweden and in 1959 Volvo Penta launched the first sterndrive at the New York Motor Show. Ironically, Kiekhaefer launched the first Mercury sterndive in 1961 at the Chicago Boat Show. By 1962 many manufacturers were producing sterndrives including OMC, the company Strang joined after leaving Mercury.

Nowadays, Mercury's Mercruiser sterndive enjoys the lion's share of the American market while Volvo-Penta are strong in Europe. Mercruiser have an enviable market on the offshore race circuits of the world and we believe the company produce the most powerful package in the shape of their 1350hp unit.

This magnificent V8 petrol unit is ideally suited to American 'muscle boats' and the company are confident that the demand for more power is not in their immediate plans. Volvo units are invariably connected to diesel engines.

To our knowledge, there is not a production sterndrive that can handle serious horsepower, particularly diesel, and designers popular choice is Arneson surface drives. The Arneson Surface Drives are among the most efficient marine propulsion systems in the world. Their surface-piercing propeller design reduces underwater drag by 50% compared to conventional submerged propeller drive systems. The only surfaces to contact the water are propeller blades and a protective skeg. This results in higher overall speed, quicker acceleration, and a better payload to power ratio... AND... 50% less drag significantly improves fuel economy while lowering operating costs.

For work, pleasure, gas, diesel, or turbine power systems capable of torque outputs exceeding 30,000 ft. pounds, the Arneson Surface Drives come in ten model sizes and various configurations for each model. Available in aluminium or bronze castings, straight or drop-center models, 12 or 24 volt compatible systems, plus the new Arneson Dual-Fin surface drives available in the ASD8 and ASD10 models.

For many years, Arneson was the popular choice of drives on Class 1 raceboats and several companies copied their concept. However over the years the size of their units have grown in size and are fitted to much larger Super-Yachts, indeed Pershing, Magnum and Sunseeker are just a few of the major players using Arneson surface drives when they're seeking performance in larger planing hulls. Several years ago, I was wandering around a boatyard in Abu Dhabi which produced traditionally built timber Dhows. Much to my surprise, there were two or three of these vintage craft sporting twin Arneson drives.

We mentioned earlier that when sterndrives first arrived on the market, several manufacturers jumped on the proverbial bandwagon but gradually over the years, those numbers >

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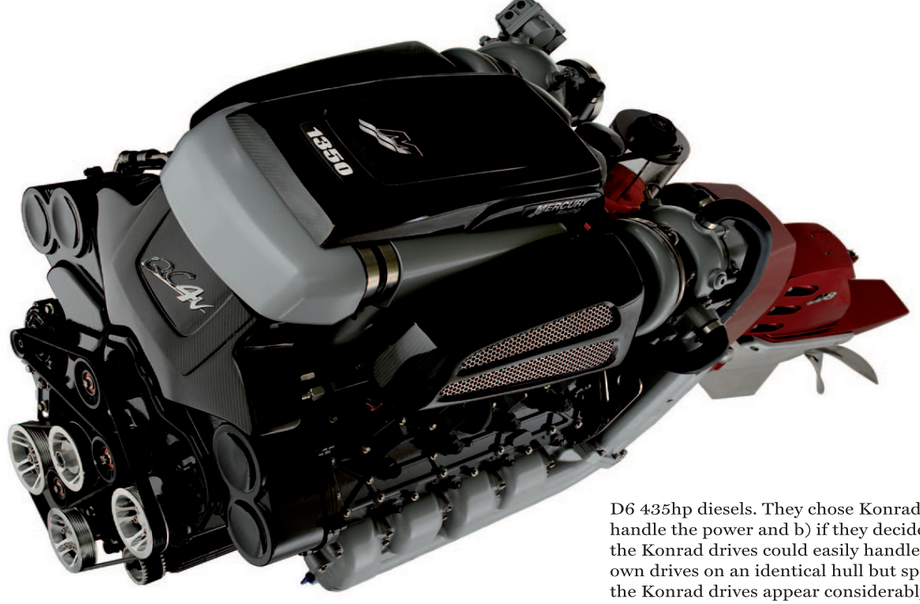
have decreased and the few that remain produce drive units that fill niche markets. One such company is Konrad Marine. The business was founded by Ken and Kathy Konrad in 1981. Ken joined the US Navy in 1966, served in Vietnam and after returning home in 67, joined his father's machine shop. It was not long before he felt the urge to enhance his career, and after gaining a degree in mechanical engineering Ken set about carving a career in that profession. It started when he developed a method of rebuilding and restoring parts off the rolling mills where metal is rolled and shaped as it cools. This innovative method saved companies tens of thousands of dollars. The Konrad's moved into a new factory where they started producing universal joints that could handle a vast amount of horsepower i.e three 1200hp motors into one gearbox turning at 100rpm with Konrad's universal joints absorbing 100,000 pounds of torque. Entry into the marine market came about almost by accident. An employee of the company came to Ken and said that his Mercury Alpha drive kept breaking and there could be a big market rebuilding them. Konrad arrived at a 1990's Miami Boat Show with one of his Alpha One aftermarket drive units which he called the Omaga. Not long after that show, diesel engine makers were asking Konrad if they could design a driver unit capable of handling the higher torque produced by diesel engines. The Konrad 500 was created specifically for diesel power but unlike the Merc, Volvo mass produced units, Konrads were manufactured on a much lower scale. After launching the 500 Series, Konrad stopped marketing Mercury aftermarket

drives to concentrate on their own products. One of Konrad's key to success has been a willingness to invest in the best tools and machinery to produce the ultimate drive that can handle big torque for long periods of time, where life expectancy of 4000 hours was quite normal. The 500 series has a bigger and more robust relation in the shape of the 600 series and it made its debut at the Miami Show. The 600 include the 620 single prop drive that handle a 20 inch wheel, the 640 which can take a 16 inch prop and the 660 duel prop drive spinning counter-rotating props up to 20 inches. Ken points out "One of the main



difference between the 500 and 600 series is the size of the gears. The 500 has 4 inch gears and the 600 are more than 6 inches in diameter. The upper gear casing on the 600 is much more substantial . When Mercruiser stopped making the TRS driver, the Konrad PRS fixing was copied so that owner could replace their Alpha drive without the need to drill more holes. Konrad are keen to stress that although they made their name with 'beefy' drives for commercial user, they still like to indulge in the high performance pleasure and racing market. Ken states: "Pleasure boat sterndrives might get 40 hours use a season whereas a commercial drive would be operated 40 hours a week. The Konrad drive is constructed in such a way that it can run for 3000 hours without a service and some units used by the navy have been known to run 10,000 hours without failing. Konrad drives are found on many commerical vessels, i.e patrol boats, fishing and survey craft and water taxis."

Ken points out, "The new anti-terrorism change of protocol introduced by the US Navy have proven invaluable for our business. When a navy ship nears to shore they are protected by patrol boats. The US Navy brought every sterndive we could produce. All the sterndrives in the Hong Kong police fleet were replaced with Konrad drives as their boats needed to operate at 40 knots and be able to intercept a vessels in 6 foot seas at 70 knots. We have satisfied clients in all corners of the world and our business has never been busier.

A testament to the Konrad drives comes from a Greek client Mr Constantinos. His company PTS Projects fitted out a Motomarine twin step deep vee hull with twin Volvo Penta D6 435hp diesels. They chose Konrad drives as a) they could handle the power and b) if they decided to increase the power, the Konrad drives could easily handle it. After comparing Volvo's own drives on an identical hull but sporting a little less power, the Konrad drives appear considerably more efficient. During testing, the only thing which took time was choosing the right props. Although Konrad's drives are the choice of commercial users and the military, they are also very popular with leisure boat owners like Mr Constantinos.

Another happy Konrad client is Charlie and Lois Amarosi who have owned a Velocity 390 for six years. They have taken part in around 60 Poker runs and Charlie reckons the best bit of his rig are the Konrad ACE 540 drives. The 67 year old stresses that 'they shift in and out of gear so easily'. When the boat was built, the idea was to fit surface drives but Velocity could not get them to line-up properly and when a friend suggested they take a look at the new Konrad drives, Velocity boss Steve Stepp asked for a pair of drives to be sent to him and they fitted perfectly although the holes for surface drives had been cut out and were larger. Originally Amarosi's boat had a pair of 888hp Pro Rock high performance engines that produced over 100mph but in 2008 Charlie blew an engine. Instead of going for an expensive rebuild, a pair of 525hp naturally aspirated big blocks were installed and the boat now runs at around 85mph. Charlie states, "the only thing we have done in six years is to send the drives back to Konrad's for them to 'freshen up' the gears and we then re-fitted them and they're as good as new.

While Konrad never has aspiration to become the new Volvo or Mercruiser mass producer of engine-stern-drive packages, there is a valued place in the market for a company to produce a high quality unit that satisfies the demands of the commercial user who needs his boat to be able to operate year in, year-out with the minimum amount of maintenance. While at the same time, the pleasure and raceboat owner will always be ready to purchase a drive system that has a proven track record of reliability.