ON LAND AND SEA

Words by **John Eichelsheim** Photos by **John Eichelsheim and Will Calver**

New Zealand company Sealegs builds amphibious boats – boats that drive on land as well as on water – and their boats are making a global splash.

There are other amphibious craft around the world, from cars that turn into boats, to hovercraft and landing craft for military use, but none is quite like a Sealegs.

Sealegs was conceived as a solution to a problem: the hassle typically involved in launching and retrieving a boat. It was intended as the perfect powerboat solution for owners of beachfront properties. In 2004 company founders David McKee-Wright and Maurice Bryham developed a three-wheeled rigid inflatable boat with two engines: an outboard for on-water propulsion and a small inboard engine to power the craft on land. The hydraulically driven wheels were mounted on extendable legs which fold up out of the way when the boat is in the water to avoid compromising its on-water performance. Sealegs was born.

When the first Sealegs were launched, they were so unusual that I remember wondering whether there was a future for such an oddball craft. Happily there was: publicly listed Sealegs Global has produced nearly 800 amphibious boats in various guises and this year the company hopes to manufacture around 120 boats at its Albany, Auckland, factory.

From the beginning the company invested millions of dollars in research and development and with every passing year Sealegs boats became more sophisticated and capable as their innovative engineering evolved. Sealegs Global's commitment to quality and engineering excellence has led to an increasing acceptance of its amphibious boats in New Zealand, and more recently worldwide recognition and sales success.

WORK AND PLAY

Sealegs amphibious marine craft are produced in two distinct families: boats destined for recreational use and boats destined for a growing range of professional craft. These are

The bracing required to support the Sealegs when it's out of the water makes the boat relatively heavy but, in the water, the stiff hull provides a soft, quiet ride and excellent rough water handling

being snapped up by rescue and response organisations: fire fighters, Coastguards and navies around the world.

Recreational and professional craft share the same core technology: aluminium-hulled, rigid inflatable or D-tube aluminium chamber construction, outboard power on the water and an inboard four-stroke petrol engine driving the hydraulics that raise and lower the legs and power the wheels on land. Two-wheel drive (rear wheels only) and all-wheel-drive (three wheels) models are available.

Sealegs produces five recreational models: 6.1m RIB; 6.1m D-Tube; 7.1m RIB; 7.7m RIB and 7.7m cabin RIB. The three professional models – 6.1m D-Tube, 7.1m RIB and 7.7m RIB – feature upgraded materials, commercial-grade tubes and redundancy systems.

In the early days Sealegs out-sourced a lot of its manufacturing: hulls, tubes, hydraulics, as well as engines, but today the company has brought most of it in-house and uses latest computer-aided technology.

The aluminium hulls, decks, consoles and superstructures are designed using CAD technology and then CNC-cut on extra-large tables inside the modern, spacious Albany facility. Forged aluminium components are still outsourced, but machined and polished in the factory. Hydraulic components are machined from bar-stock aluminium and stainless steel using huge computer-controlled milling machines, while the thousands of special fittings and valves are, for the most part, engineered on-site.

Sealegs has invested heavily in its patented amphibious technology. Ted Dixon, national sales manager at Sealegs, says that by taking control of as many aspects of the design and build process as possible, the company is able to achieve and maintain the high level of quality its customers demand.

"Sealegs boats can do things no other boats can do and they appeal to a certain type of customer. Sealegs owners generally don't pay much attention to the price, but their expectations are extremely high – our boats have to work as they are meant to, perhaps even exceed owners' expectations," Dixon says.

VALUE LIES UNDER THE SKIN

A tour through the Sealegs factory illustrated why these craft are at the high end of the price spectrum. Of course there is their ability to drive on land as well as water, but it is the quality and sophistication of their engineering that is really impressive.

For example, one look at a Sealegs hull under construction reveals a level of longitudinal and torsional bracing far in excess of a typical aluminium boat. The bracing is largely to support the boat out of the water when it rides on three wheels at the hull's extremities. It prevents twisting and distortion, especially when the Sealegs traverses uneven terrain. All that bracing makes the boat relatively heavy, but in the water such a stiff hull provides a soft, quiet ride and excellent rough water handling.

The robust construction extends to other aspects of the boats' build, from fully welded and sealed decks, to CNC-cut consoles – even the aluminium fuel and hydraulic fluid tanks, which are individually serial-numbered and pressure-tested in the factory. All the boats are built to comply with CE (Europe) and US Coastguard regulations and it's a simple matter to meet NZ survey.

But bulletproof construction doesn't come at the expense of the boat's aesthetics: the welding, fit, general finish and paint by a local contractor are impeccable, while the styling works well considering there are large wheels in the corners. Standard equipment levels are high and there is a comprehensive options list comprising virtually anything a prospective owner could want on a boat of this size. Staff take extra care to protect the boats from accidental damage during the assembly process and you could eat off the factory floor.

The Albany plant also services Sealegs boats, including hydraulic and electrical systems, collecting and delivering boats locally and sending service technicians outside the Auckland region. Upgrades to owners of older models are also offered.

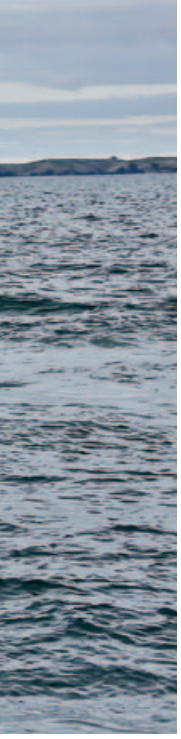
THE SEALEGS SYSTEM

Sealegs amphibious craft feature retracting tricycle undercarriages that stow clear of the water once the boats are launched. At the push of a button, the legs extend or retract, transforming the vehicle from an ocean-going craft to an all-terrain vehicle capable of negotiating quite challenging ground, sand dunes and rutted tracks. Drive in and drive out – no waiting and no trailer parking hassles.

All the components of the undercarriage are designed for saltwater use and the vehicle's hull/chassis is especially braced and strengthened to withstand cross-country use. AWD models are capable off-road, which is particularly useful for professional users and owners with challenging beach access.

On land, the boats are powered by a small petrol inboard engine driving hydraulic pumps that operate steerable motorised wheels. Sealed hydraulic motors inside the wheel hubs give a top speed of around 8kph for AWD models or 10kph for two-wheel-drive models. Driving all three wheels provides superior off-road performance.

Current models use quiet 24hp Honda air-cooled four-stroke V-twin engines, marinised at the Sealegs factory and housed in sound-insulated engine boxes aft or amidships. Most models (XRT) are fitted with oil-cooling radiators to extend the run time of the hydraulic motors to at least 30 minutes before they need to cool down. Hydraulic systems are individually tested and put through the equivalent of 100



Sealegs' Ted Dixon, left, and John Eichelsheim check out the centre console; middle: a joystick controls forward, reverse and vehicle speed on land; above right: the hydraulically controlled front wheel

cycles before boats leave the factory.

The majority of Sealegs craft are fitted with Evinrude E-Tec direct-injection two-stroke outboards, but Dixon says Sealegs can provide Yamaha outboards if customers prefer a four-stroke option.

"We tend to use E-Tecs because their warranty is truly international rather than relying on a local [national] supplier who hasn't installed the engine for support, which makes things easier when we export boats," says Dixon.

Single outboard installations are usual, but Sealegs offers twin engines on its largest Professional models. Performance on the water is at least as good as conventional RIBs of comparable size, in keeping with Sealegs' stated aim of "no compromise on the water".

THOROUGHLY TESTED

We rode along for the sea trial phase of pre-delivery testing for a new Sealegs 7F AWD 7.7m centre-console craft.

Assembly manager William Crocker subjects every new boat to a comprehensive list of checks to ensure its electrical, hydraulic and mechanical systems are working exactly as they should and that the boat meets or exceeds the performance parameters set by the company.

"With so many boats under our belt, we have a very clear idea of how each model needs to be set up for optimum performance and exactly what that performance should be for each model

and power option," says Crocker.

The sea trial starts at the factory when Crocker or one of his staff starts the inboard engine to power up the hydraulics. This raises the craft from its squatting position on the factory floor. Once the legs are fully deployed, the boat is driven onto the road trailer and secured for the 10km journey to the sea.

At the beach Crocker made the usual pre-launch checks, removed the strops and safety chain and then started the Honda inboard. Raising the boat off the trailer on its legs, he engaged the hydraulic hub motors and slowly backed off the trailer. Forward, reverse and vehicle speed on land are controlled by a joystick on the console while the front wheel, like the outboard, is steered using the wheel.

With three of us aboard, we drove across the beach and into the bay, lowering and then starting the outboard as soon as there was sufficient water. With the outboard in gear and providing forward momentum, we continued deeper until the wheels no longer touched the bottom, at which point they were retracted. The front and rear wheels retract and extend on separate hydraulic circuits with separate switches; the back wheels lift and lower together.

Out beyond the bay, Crocker put the boat through its paces, checking its hole shot, 0-60kph time – 8 seconds; throttle response; revolutions at full throttle – 5700rpm; and top speed – 36.5 knots.

This boat was fitted with an E-Tec 150hp outboard, which copes well with the RIB's considerable 1600kg weight, but the 7F is also available with a 200hp E-Tec, giving it a top speed of approximately 43 knots.

Crocker threw the boat around to make sure it handled as it should, monitoring the engine gauges, steering and ensuring everything was properly bolted down.

Observing from one of the comfortable gas-strut pedestal seats, I noted that the boat felt solid and stiff. It gives the impression that it's quite heavy, but performance is brisk and the ride is excellent – smooth, dry and quiet.

The hull will go harder than the

Sealegs on the road

While the whole point of a Sealegs boat is to be self-propelled on land and in water, there are times when a conventional boat trailer is desirable.

To transport Sealegs boats legally by road, the company commissioned Hamilton's Voyager Trailers to design and built a low-riding, drive-on, drive-off trailer suitable for transporting Sealegs boats.

Most owners neither need nor want a road trailer for their Sealegs boats, but they are available if required and the factory uses one on an almost daily basis for Sealegs delivery and transport duties.

CNC technology at the Sealegs factory ensures excellent quality control

Export success

Until a few years ago Sealegs amphibious craft were pitched mainly at the recreational market with the bulk of sales in New Zealand. However, recreational sales in international markets have increased markedly, particularly the USA. Sealegs boats fit inside a standard container once the tubes are deflated for export. Export sales of Sealegs' recreational models in Europe, Asia and the USA continue to grow.

More recently Sealegs has worked hard to develop its Professional range, enjoying considerable export and domestic sales success. The Professional range has found favour with military and para-military, fire-fighting, rescue and response, Coastguard and similar organisations around the world.

Notable successes include sales to NZ Coastguard, the Malaysian Fire Department, Italian Fire Department, Jackson (USA) Fire Department, Victorian (Aus) State Emergency Services, Australian Parks and Wildlife, Indian Police Force and the Thai Navy. The most recent sales include 10 boats destined for fire-fighting duties in Russia.

passengers: in the tight turns we had to hang on like grim death. There was not a suggestion of cavitation and the boat could be turned as sharply as you like without any consideration for engine trim.

We spent around an hour on the water while Crocker checked every system against his list. The trial was cut short only when testing revealed an oil line clamp from the two-stroke outboard oil reservoir had come loose, forcing us to head back to shore under reduced power.

As he pointed out, it's far better to discover a fault before delivery than afterwards, which is why every Sealegs boat is trialled this way.

Leaving the water was just like entering it, but in reverse. As we closed in on the shore, Crocker lowered the front wheel, at the same time raising the outboard leg but still maintaining thrust and steering. He then lowered the rear wheels, engaged the hydraulic motors and used the outboard to push us along until the wheels touched sand and took over propulsion duties.

The outboard was switched off, the leg raised further and the Sealegs climbed out of the sea under its own power – a brilliantly easy, seamless one-person operation, which is what Sealegs amphibious boats are all about.