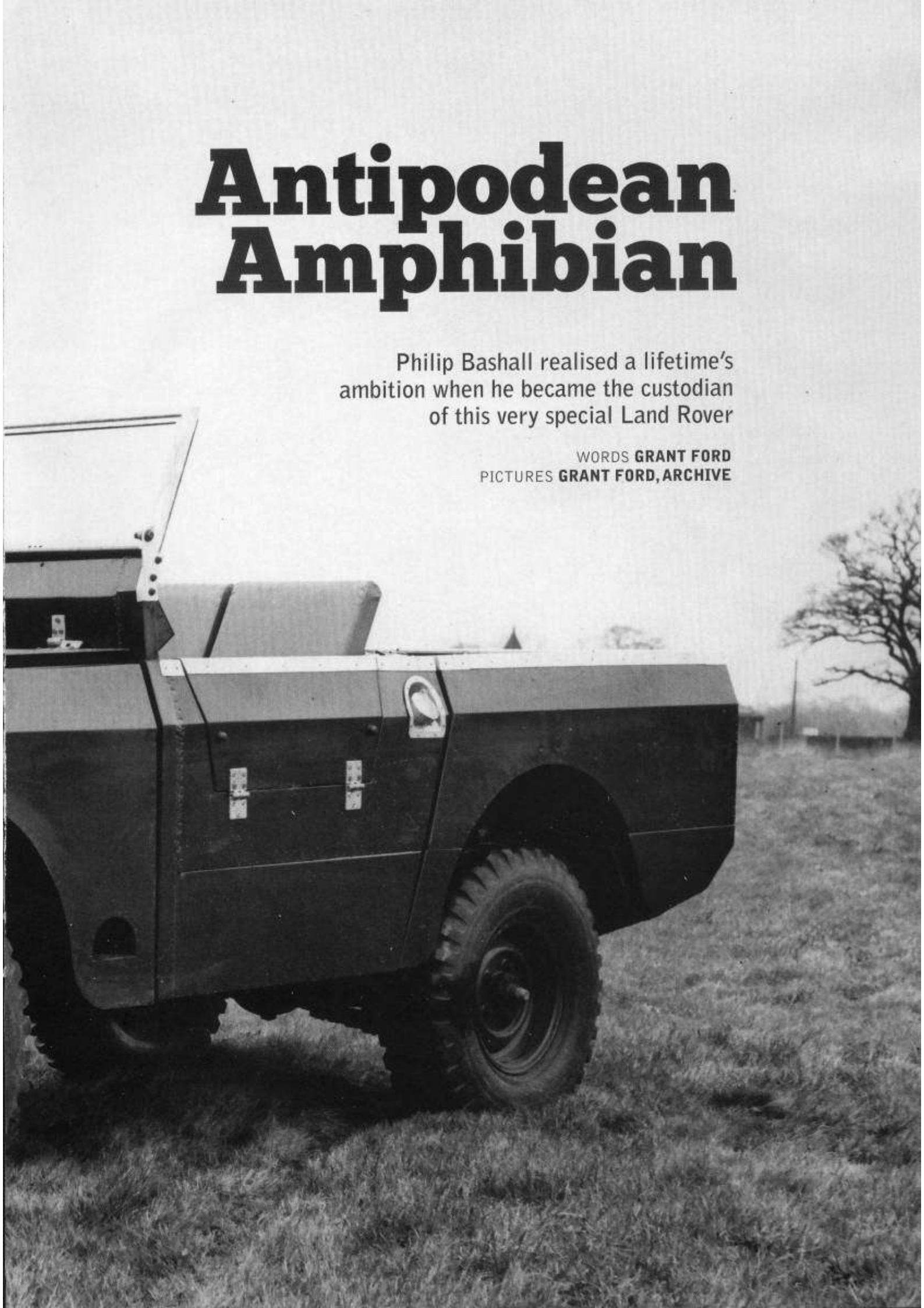
# Antipodean Amphibian

Philip Bashall realised a lifetime's ambition when he became the custodian of this very special Land Rover

WORDS **GRANT FORD**
PICTURES **GRANT FORD, ARCHIVE**



## ONE TON AMPHIBIOUS LAND ROVER

In April 1965 the Australian government of Robert Menzies announced increased involvement in the Vietnam conflict and Land Rover looked to supply Australian forces with the perfect vehicle for the operations in south east Asia. Issues with crossing heavily flooded paddy fields had come to the fore and the army realised their need for a rapid all-terrain vehicle with the ability not just to wade but swim. The One Ton Amphibious Land Rover (OTAL) was constructed by the Land Rover military engineering department with a 97in wheelbase as a commander's/radio car especially for the Australian Army.

Their brief was 'a vehicle which has all the characteristics of a Land Rover but in addition is able to cross inland water without special preparation and without using appliqué flotation kits'. The OTAL never reached the Red River Delta or even Vietnam but was tested extensively at the proving facility of Monegeetta north of Melbourne and crossed Canberra's Lake Burley Griffin in a bid to impress the military hierarchy although further orders were not pursued.

Land Rover had produced the air-portable FV 18051 (Scheme A) APGP in 1962/3 in small numbers (estimates of 28) - a Series IIA 109in with storable floatation equipment inflated via the vehicle's exhaust - its drawbacks being assembly time before taking to the water and the vulnerability of its airbags under fire.

The FV 18061 (Scheme B) of 1962 was a truck that reached mock-up stage and featured a 97in wheelbase and while similarities to the OTAL end there, it did offer an exoskeleton body with inherent floatation abilities.

An air-portable 4x4 with a one-ton payload powered by the 77bhp four-cylinder engine confirms Land Rover had amphibious ambitions prior to the Australian requirement.

While the Australian Army had been utilising Land Rovers from the early 1950s the OTAL wasn't considered suitable and consequently the production ceased with one unique example, chassis number 97/1.

LEFT: **Doors are an integral part of the amphib's hull;** BELOW: **The beautifully-finished and painstaking restoration of the OTAL following a spell in the Dunsfold workshop**


BELOW: **It looks like a Land Rover but has the added advantage of being able to 'swim'**

**'On road the OTAL proved extremely capable and images showing its cross-country prowess enhance its credentials'**

Although a similar overall size to existing Land Rovers of the time, it didn't share their 88in or 109in platform but most of the running gear was standard Solihull fare, thus parts availability should have made the OTAL an attractive proposition to a military force with parts stock and familiarity.

The all-aluminium body is built in a sealed pod-style with hand constructed rear and centre/cab sections. The front wings are bolt-on watertight units offering buoyancy with easy removal providing greater access to the engine area and a sealed tool box hatch on top of each. Any space suitable on the vehicle including the chassis was filled with polyurethane foam. As well as adding buoyancy it is unaffected by bullets, unlike the earlier floatation bags. Crew entry is via two folding doors with a non-slip step installed, once closed these form a seal, as the test images show the waterline runs high along the vehicle.

A specially adapted and modified 2.6-litre straight-six petrol engine was fitted, its origins from the earlier Rover 90 saloon fuelled by a single SU carb. A surprising choice of powerplant considering all Land Rovers used by the Australian military featured the 2,286cc four cylinder, although none of them pulled a hefty 3950lbs unladen weight.

Fully loaded the OTAL tipped in at 2.83 imperial tons which justifies the 83bhp and more importantly 128 ft/lbs at just 1500rpm provided by the increased capacity; the 2.6 was introduced in the UK 109-inch Station Wagon around the same time.

While few reports from the UK trials are available, one did confirm "cross-country performance is up to normal Land Rover standards with good approach and departure angles and adequate floatation on large tyres".

Both engine and gearbox are sealed units vented by pipework that remains above the waterline. Intake is via a snorkel sitting just behind the winch and the exhaust ➲

FROM TOP: **Showing just 3,712 miles travelled the OTAL interior is a functional but comfortable place; The attention to detail of this restoration went way beyond skin-deep; Freshly painted centre cab section is re-secured to chassis. Note the engine cooling has been plumbed in; Rear tub in situ, the restoration nears completion in 2008**

## OTAL One Ton Amphibious Land Rover Specification

Obtained from the Dunsfold Collection as supplied to Australian Military

### DIMENSIONS

**Wheelbase:** 97in

**Track:** 53 ½ in

**Overall Length:** 14ft 6 ¾ in

**Overall Width:** 5ft 9 ¾ in

**Overall Height:** 6ft 10 ½

**Loading Area:** 20.5 ft2

### EQUIPMENT

**Tyre size:** 9.00 x 16

**Rim size:** 6 ½ L x 16

**Electrical:** 12v DC

### TRANSMISSION

**Main Gearbox Ratios:**

Top 1.00: 1
3rd 1.512: 1
2nd 2.22: 1
1st 3.6: 1
Rev 3.0: 1

**Transfer Box Ratio**

High 1.148: 1
Low 2.4: 1

**Axle Ratio**

4.7: 1

### ENGINE

**Rover 2.6 in-line six-cylinder**

**Max Power:** 83bhp @ 4500rpm

**Max Torque:** 128 lb ft @ 1500rpm

### DATA

**Ground clearance:** 11in unladen

**Approach angle:** 44° unladen

**Departure angle:** 45° unladen

**Unladen weight:** 3950lbs

**Payload:** one-ton including driver & passengers

**Gross vehicle weight:** 6,350lbs

## View from the Pilot...

OTAL restorer and trustee of the Dunsfold Collection Philip Bashall offers his thoughts on the delights of this unique amphibian:

"What turned me on to it? Well I guess it had to be the banana splits with their amphicats six-wheeled buggy things, the thought, as a nipper, of having one of them never went away. When I saw the OTAL, it reminded me of the excitement of having a vehicle you can just drive into a lake and out again (hopefully) and a Land Rover to boot, the Land Rover bug had bitten by then."

"I pestered my father to get it but it never happened. We always knew it was safe at Eastnor and hoped one day it might come up for grabs.

Having done a ground-up restoration, a chance find of the original specification leaflet and a rake of photos helped the project along. I really enjoyed the restoration and I'm not just saying this but it is one of the nicest Land Rover models to drive."

"The noise from the small bore exhaust and the rev limit, which seems very high, sounds superb and it will always draw a crowd wherever it goes. Just to master the climbing in bit is an art and I have many scars where a foot has slipped out of the tread strip inside the door. I still have things to do like the canvas door tops and plumbing in the winch but with a good dose of WD40 and lots of silicone grease I am determined to re-float the old dear. Having swum the APGP, Stalwarts, DUKWs, Weasels, Snow Cats, Gamma Goats and my Amphibious Jeep GPA, this has to be the next one."

Watch this space!

BELOW: **The OTAL has a 97in wheelbase but uses numerous standard Land Rover components**

exits at the rear behind the driver, right on the water level; an additional section of pipe is attached as required and is culminated at roof height.

The distributor from a wartime Daimler Scout car is sealed and sits on an extended 8in alloy housing. The water line sits level with the head gasket which was successful on the prototype but if production had begun the engine compartment would have been completely sealed; also aiding buoyancy.

The gearbox is four-speed and of One-Ton specification while a hydraulic pump powers the winch which is controlled from inside the cab. Although tests were carried out with deflectors near the wheels and a propeller driven via a hydraulic pump, initially the OTAL made progress on water, steering and powered by its road wheels.

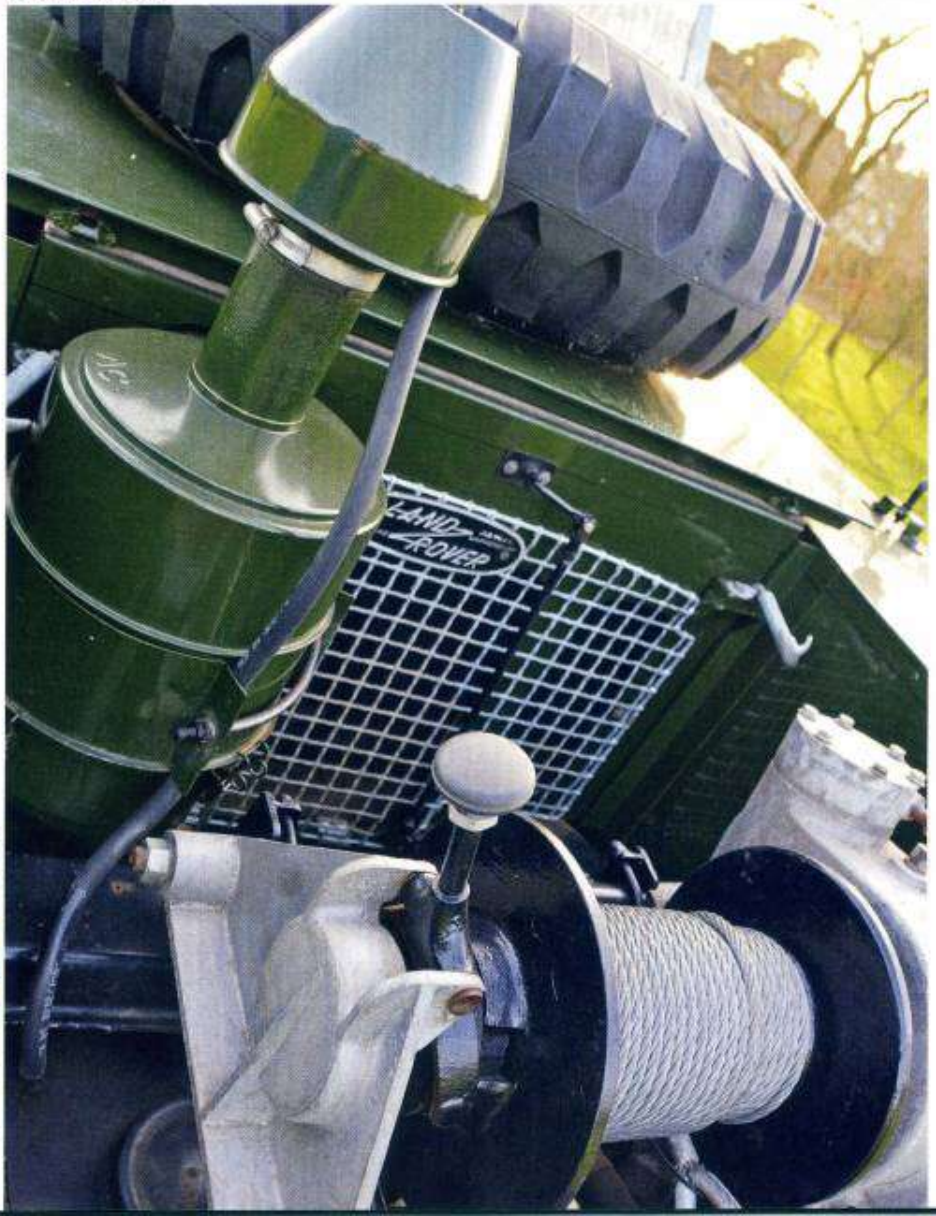
On road the OTAL proved extremely capable and images showing its cross-country prowess enhance its reputation but photographs of initial tank controlled water tests look precarious. The engineers were able to correct any issues and there were certainly no 'sinking feelings' when the OTAL crossed the lake at Packington Park, a country estate in Warwickshire, prior to its month-long journey around the globe.

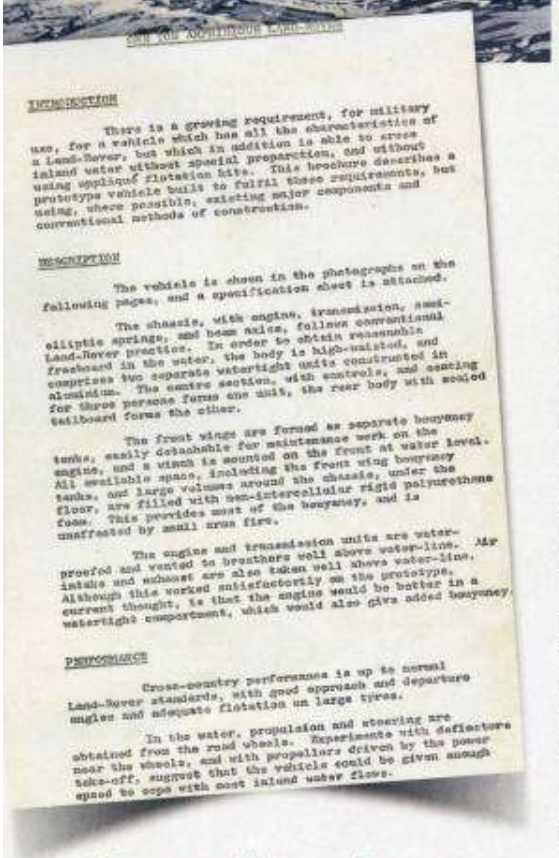
## Rejected & Returned

Although it is known that the OTAL was well tested in Australia, why it wasn't suitable remains a mystery, the army opted to 'airlift' their Land Rovers over Vietnamese water obstacles instead. Upon arrival on a new continent in the first half of 1966 the OTAL received an army number plate of 108-430 and while it survived testing in New South Wales, this all-terrain vehicle would become redundant on its return to Solihull. The OTAL found its way to Eastnor Castle, home of Land Rover testing since 1961. Deep in rural Herefordshire the 500 acres have offered test and trails to all-wheel drive vehicles for decades.

The OTAL was given a coat of Ferguson

RIGHT: **Straight six 2.6 litres of Rover power and note the twin fuel pumps filling the large single SU carburettor;** BELOW: **Front-mounted winch could have been useful in getting out of the water on occasion**





INTRODUCTION

There is a growing requirement, for military use, for a vehicle which has all the characteristics of a Land-Rover, but which in addition is able to cross inland water without special preparation, and without using applique flotation kits. This brochure describes a prototype vehicle built to fulfil these requirements, but using, where possible, existing major components and conventional methods of construction.

DESCRIPTION

The vehicle is shown in the photographs on the following pages, and a specification sheet is attached.

The chassis, with engine, transmission, semi-elliptic springs, and beam axles, follows conventional Land-Rover practice. In order to obtain reasonable freeboard in the water, the body is high-waisted, and comprises two separate watertight units constructed in aluminium. The centre section, with controls, and seating for three persons forms one unit, the rear body with sealed tailboard forms the other.

The front wings are formed as separate buoyancy tanks, easily detachable for maintenance work on the engine, and a winch is mounted on the front at water level. All available space, including the front wing buoyancy tanks, and large volumes around the chassis, under the floor, are filled with open-intercellular rigid polyurethane foam. This provides most of the buoyancy, and is unaffected by small areas fire.

The engine and transmission units are water-proofed and vented to breathers well above water-line. Air intake and exhaust are also taken well above water-line. Although this worked satisfactorily on the prototype, current thought, is that the engine would be better in a watertight compartment, which would also give added buoyancy.

PERFORMANCE

Cross-country performance is up to normal Land-Rover standards, with good approach and departure angles and adequate flotation on large tyres.

In the water, propulsion and steering are obtained from the road wheels. Experiments with deflectors near the wheels, and with propellors driven by the power take-off, suggest that the vehicle could be given enough speed to cope with most inland water flows.

**'Once all sections were watertight again the body could be reassembled'**

**TOP: First entry in the lake and the look of slight concern on the passenger's face is understandable; ABOVE: Evidence of slight damage to the driver's side rear panel no doubt achieved during the trials; LEFT: Original test report as discovered by Philip at the Dunsfold Collection**

Tractor grey and was adapted for use as a snow plough with a 1969 civilian registration TVJ 237J. Fitted with chunky Firestone Super All-Traction rubber, the OTAL was often used to rescue everything from gas cylinder delivery trucks to holidaymakers and their caravans.

It was around this time a nine-year-old Philip Bashall first saw the Land Rover of his dreams, a 'must have' vehicle, it was his passion that ensured the OTAL can be enjoyed 47 years later.

During its time at Eastnor it became apparent the steering was becoming heavy, making the amphibian more of a challenge to manoeuvre. Checks were carried out to isolate a fault but mechanically nothing was discovered until water was found inside the front wings; after drilling a hole in both, around 40 gallons escaped and its driveability returned.

The OTAL was often seen at military vehicle shows during the mid-1970s but by 1983 it resided with the British Motor Industry Heritage Trust at their museum in Gaydon, Warwickshire.

## Realise & Restore

During 2008, a rumour of vehicle opportunities within Gaydon reached the ears of Philip Bashall. The man who had first seen the OTAL as a young lad in 1970 was now overseeing the largest of Land Rover collections at Dunsfold in Surrey. "It was the chance I couldn't turn down," he says, and after some 'horse trading' a lifelong dream was realised.

Showing just 3,571 miles, the amphibian re-registered KYY 501C sat in his workshops and images taken on arrival show the OTAL was in need of Philip's restoration talents. "Yes it was a little rough but nothing worse than I had done before," he admits.

The strip-down was carefully carried out with all parts catalogued until just the


**RIGHT: Life got tough for the OTAL on return to the UK here rescuing a stranded Calor Gas delivery at Eastnor in the late 1960s**

**ABOVE: Normal Land Rover off-road capabilities were expected and achieved by the marque's military engineering department; LEFT: Under way creating a slight bow wave and note the ballast sacks in the rear with hose to remove unwanted flooding**

chassis remained which was in good order considering the environment it had operated in. A complete blast and etch-primed with no welding required was a good start. The front axle was bent so a replacement case was sourced, the internals had little wear and reassembly soon followed. The rear axle was just stripped and repainted as was the standard One-Ton gearbox.

Philip had got the engine running prior to removal. However an inspection was prudent so the cylinder head was removed but with minimal wear to be found, new gaskets were fitted and the straight-six was reassembled prior to detailing.

Another problem was that both fuel tanks were rusted out and were not useable, while the complete wiring loom was given to specialists Autosparks who bravely accepted the challenge and constructed a new one from scratch.

Philip found holes drilled everywhere as the prototype had been unable to drain itself, these would receive specialist alloy welding repairs with drain plugs installed, including both the front wings that had released 40 gallons many years before.

During initial water tests in the 1960s a small bilge pump attached to a garden hose acted to remove unwanted flooding but now even the centre tub area had holes that required repair and drains to be fitted.

Once all sections were watertight again the body could be reassembled and Philip noted the hooks for the buoyancy aids remained across the underside, unfortunately the aids originally attached by canvas straps had long since gone.

The newly fitted custom-made hood complements the gleaming paint and polished aluminium, all of which emphasise the attention to detail this restoration demanded over six months.

A chance to travel in something so unique was gratefully accepted and the first task was to lift my bulk up and into the cab area. With seating for three up front it is far from cramped and remarkably comfortable and, as the straight-six roared into life, the lack of sound deadening reminds you this is a military vehicle.

Whatever failed to impress the Australian purchasers in the mid-60s I doubt it was the performance, with ample power to remain with all but the fastest of modern traffic. The OTAL did return to its original launch site at Packington Park in 2013 to star in the 65th anniversary celebrations of the Land Rover marque. Placed on the same slipway that it left in 1966 was a reminder to current custodian Philip Bashall of his ambition to re-enter the water when the chance permits. The OTAL is currently housed within the Dunsfold Collection which can be seen by the public at their biennial open days. CLR

## Thank you

A sincere thank you to Philip Bashall for his assistance and time in producing this article. The Dunsfold Collection of Land Rovers is a registered charity dedicated to the preservation of Land Rover history. The collection was started in 1968 by Brian Bashall who realised that his love of strange prototype and pre-production Land Rovers was of interest to others. To find out more and admire their vast array of Solihull's finest vehicles visit www.dunsfoldcollection.co.uk