

## THE DUKW

When I was a young boy in the 1950s I looked forward each week to receiving my copy of Eagle, a comic full of the sci-fi future with Dan Dare and his tussles with the evil Mekon, but with greater anticipation for The Rover, a precursor of Commando. World War II was still a fading memory. I recall the doodlebugs, (V1) and the more deadly V2. Their explosions and the resounding vibration provoked a not dissimilar reaction of delight to a child today watching a major firework display.....I am reputed to have clapped my hands and said "More, more"! One landed 150 yards away from our house totally demolishing eight houses and forming a bombed site where, to the horror of my parents, I delighted in playing with the local urchins among the broken glass and shrapnel and rubble in what had once been the cellars. It was all high adventure! The Rover was full of tales of daring do by Spitfire and Hurricane pilots, of Beaufort bombers and Lancasters evading Me 109s and Tommies taking out machine gun nests. One's pulse raced in the reading. Consequently, as a child one was well versed and equally fascinated by the technological miracles of the age which had allowed the allies to win the war – mainly British inventions of course, such as the early use of radar, the cracking of Enigma and the Lorenz machine and the U boat ciphers at Bletchley Park, the miracle of the first great computer of the age, the 'Robinson' and from 1943 Colossus, the invention of Pluto, the fuel pipeline, and the Mulberry harbours which guaranteed the success of the Normandy invasion and Frank Whittle's jet engine. Lastly there was the humble DUKW and this was an Anglo-American co-operation.

DUKW – in my mind this acronym has always summoned up images of feathered ducks! After all it floated and so did they - so that must be the reason for the name I assumed. Not at all. In the best military tradition the nomenclature has a distinct meaning: D equates to a vehicle designed in 1942. The U stands for utility (amphibious). The K stands for four wheel drive while the W indicates two powered rear axles. In American Army terminology they were often referred to as 'duck boats' and given a nickname as 'old magoo' or just 'magoo'.

In early 1942 ships sat waiting to discharge cargo into lighters, barges and rafts at foreign ports. The ships waited to trans-ship, the barges waited for trucks, the trucks for trains. Thus planners rapidly discovered the need to deliver high priority cargos more rapidly, such as ammunition to the beach head or troops. The DUKW was the answer though the NDRC engineers' first mission was an amphibious jeep known as the 'Seep' which also resulted from the 1941 collaboration between S & S and the Army's amphibious experiment. This was based on the ¼ ton Ford GPA but the craft were too small for choppy waters and had a tendency to sink. Small quantities were shipped to Europe, and the Pacific, but while they worked well in shallow water they were not capable of a ship to shore supply assignment. Palmer C.Putnam in charge of the National Research Defence Committee decided a larger vehicle was required equally capable on land and sea. The result was the DUKW designed by Rod Stephens Jr. and the S &S design office in conjunction with Frank W. Speir, an ROTC lieutenant out of MIT and Dennis Puleston a British sailor. They all worked in conjunction with E.T.Todd, E.W.Allen and Palmer Cossett of General Motors. At first, like with so many innovations, the army ridiculed the whole idea and gave it scant attention. Then one day up near Provincetown, Mass., a Coast Guard patrol vessel ran aground on a sandbank and no one could get to her in the 60 knot high wind, surf and rain to pull her off with her crew of seven. An experimental DUKW was in the area on trials and pulled her off without difficulty and from then on opposition

melted away. In July 1942 a demonstration at Fort Belvoir, Virginia, cleared the way for the initial order of 2000 DUKW-353 series and load tests were carried out in Fort Story.

A prototype DUKW was built based on a six-wheel drive GMC ACKWX military truck with the addition of a watertight hull and propeller. Later on the final production version weighing 7.5 tons, Length 31 feet, Beam 8ft 2 in and with a GMC straight 6 4.4 litre 91.5 hp engine was built based on the CCKW 2 ½ ton 6x6 truck built by the GMC division of General Motors and which had been in production for just 18 months. This truck had a capacity of hauling 5000 lbs. of stores or artillery or 25 men. The engine however was an old workhorse having been in production in trucks and buses for ten years and had already seen production of over half a million units, so to say the least it was considered 'proven'. The vehicle/vessel was capable of 6.4 mph (10 kph) in water and 50 mph (80 kph) on land with a range respectively of 50 miles in water or almost 220 miles on land. Although in no way armoured, 21,000 examples were built over the succeeding years at a cost of \$10,750 per unit. Two thousand were offered on 'lend-lease' to British forces. How S & S must have wished they were getting handsome royalties! The bodywork was between only 1/16 and 1/8 inch thick (1.5 to 3 mm) in order to reduce the weight and a very high-capacity bilge pump was installed to keep the vessel afloat in the event that the hull was breached up to a hole of several inches. Normal bilge pumps would have been useless so the craft was supplied with a hand pump for when the propeller shaft was not turning, a self priming manifold pump, and a high capacity pump actuated by the water level in the bilge. In all the total capacity was a very considerable 300 gallons per minute (1350 litres per minute). The driver's compartment was made of plywood.

When converting what was a basic truck into an amphibian the power plant, transfer case, drive shafts and axles and brake system could be cannibalised without much change. But the body parts winch, cooling and steering required changes. The cooling system was innovative. Air was drawn from behind the driver, pushed through a radiator and exhausted each side of the driver. Apparently tests used 40 to 50 combinations of radiators, shrouds, fans and ducts before the system was pronounced satisfactory. There was also a complex heating system to prevent water freezing on the deck and affecting stability, or in the bilge or pumps. Exhaust air from the engine blew into a forward compartment and out through ducts and shutters circulating down the hull sides. Rod realised that the shape of the bow and stern would be determined by the angles of departure and approach to land and the hull sides were rounded at the bow in order to decrease water resistance while at the same time increasing visibility.

The US Navy did not have enough men to train for the DUKW mission so it was left to the army. The first Engineer Amphibian Command was formed in the summer of 1942. A Boat training Center was established at Camp Edwards, MA and locals were enrolled to teach recruits boat maintenance on a three week course! Instructors were sent to general Motors and various civilian companies taught another 1065 instructors diesel maintenance. In fact Rod's involvement did not cease with the design – he was involved in training and travelled to England and the Pacific.

A British RASC company consisted of 470 men and 132 DUKW with four men per vehicle ( A U.S. DUKW company consisted of 50 DUKW and 173 men and officers). Our Honorary Chairman, Terry Sprake, commanded a section of five DUKW craft at a beach assault landing in North Africa. Terry complained to Olin recently when they met, that the DUKWs became bogged down in the sand. Olin replied "did you let down the tire pressure?" In fact the craft were the world's first vehicle to allow a driver to vary the tire

pressure from inside the cab, an accomplishment devised by Speier incorporating an onboard air compressor and tank. This is now a standard feature for military vehicles allowing the tires to be fully inflated for road use and deflated for softer surfaces. The DUKWs not only proved seaworthy in the choppy English Channel but ferried 3 million tons of supplies ashore in the three months following the Normandy landings!

In 1943 DUKWS were embarked for the Pacific and landed troops on Noumea in New Caledonia. It was a small but successful exercise. As a result the Transportation Corps established 15 Amphibious Truck Battalions. The DUKWS also proved themselves at Salerno, Italy when in three weeks 90 landing craft and 150 DUKWs moved 190,000 troops with 30,000 vehicles and 12,000 tons of supplies.

In Normandy in 1944 19 companies were assigned to the invasion, 12 to Omaha Beach alone. The DUKWs delivered their initial cargo of troops and then shuttled between the off lying ships and shore ferrying cargo. The DUKWS were initially loaded on 5 June 1944 onto LSTs with their troops at Weymouth and were offloaded 14 miles (22 ½ kms) offshore for the final run to the beach. The final invasion had not been without rehearsal. In autumn 1943 3000 people and livestock had been evacuated from the SW coast of England adjacent to Slapton Sands in an area covering 30,000 acres and resembling Utah beach in Normandy. Every last detail of the final invasion plan was rehearsed. A version was even tried at West Bay fitted with long extending escape ladders, loaned by the London Fire Brigade, with a view to scaling the cliffs at Ponte de Hoc. This was abandoned when it was found the vehicle could not get close enough to the cliff base.

The value of the DUKWs was considerable. As Dwight Eisenhower pointed out prior to the invention of amphibious DUKWs or the larger LARCS the capture of a port within a short space of time after any invasion had in the past been an imperative but now 50 DUKWS could unload a Liberty ship within 72 hours. Early on on D-Day 125 DUKWs were sent by Admiral Hall to ferry 105mm howitzers to the beachhead. Had they not arrived thirty minutes before the German tanks counter attacked the result would have been disastrous.

The DUKWs were again used for the last time in Europe for the crossing of the Rhine into Germany in March 1945. On this occasion 370 craft were used. In the Pacific where they had first been tested they were much in demand. Thirteen full companies were used in the invasion of the Philippines. At Tacloban in Leyte 20 vehicles moved 1847 tons of equipment in a 24 hour period over a 9 ½ mile round trip to and from the ships to a supply dump. When the Japanese filled Manilla harbour with sunken wreckage the Army captured the city and was supplied by DUKW. In the final and extremely bloody battle for Okinawa the DUKWs moved artillery and ammunition to the front near Naha on the Shuri defence line.

At the end of hostilities a reduced number of DUKWs were mothballed or kept in service for training. These were hastily called back to duty with the outbreak of the Korean War 1950-53 and saw service there. Much later on there were some derivative developments of the DUKW. The British Alvis-Stalwart amphibious truck was a heavier duty vehicle designed for a longer working life. It was more sophisticated than the DUKW relying on a hydraulically operated water jet with inlets each side forward ejecting aft. The water jet rotated to steer the craft when afloat. Some Stalwarts were converted by American operators for tour vessel usage in the 1990s

Another DUKW derivative was the LARC or Light Amphibious Re-supply Cargo. This was an attempt to improve on some of the DUKW's shortcomings and to design a new vehicle/craft from the ground up. Borg-Warner was commissioned to do a 10 year study. The final result looked a lot less business like than the DUKW and was essentially a motorboat with wheels. Less than 1000 were built of which roughly 550 saw service in Vietnam. Some examples were later given to coastal authorities for rescue use and many may have been scrapped for their aluminium. Approximately 85 are still retained in service. The LARCs had the advantage of longevity on account of the alloy body, maximum stability and excellent engineering so that many were adapted to sightseeing use. DUKWs are street legal and one is used for DUKW tours in London., others for adventure tours in the US. Should your fancy lie in that direction instead of your fine S & S sailing vessel you are not too late to purchase a DUKW through The Chicago DUKW Corporation. You will still be eligible for membership to *The Sparkman & Stephens Association!* However, for those of you who race, I am unsure what rule she would rate under.....

PATRICK MATTHIESEN