



OPPERMAN SCORPION MK I

With five axles and eight wheels, of three different sizes, this must be the world's weirdest military vehicle

Beating off close competition from the Swamp Skipper, the Marsh Screw and the Hover-Rover, the all-time winner for the title of weirdest military vehicle of all time goes, by unanimous verdict, to the Opperman Scorpion Mk 1...

Designed and built by the engineering company S E Opperman Limited of Elstree, Borehamwood, the five-axle, eight-wheeled amphibious Scorpion pilot vehicle was submitted to TT2 for trials in 1942. Although the prototype wasn't armed, it was described as a 'light tank'.

With hindsight, it's difficult to see the role envisaged for this curious machine. Although it was primarily an engineering development vehicle, there was no cargo space and it was unarmed. Writing in his 1983 ISO publication, 'MV1 Amphibious vehicles', author Jeff Woods opined that it was intended to 'clear enemy beach heads'. With its pneumatic tyres and lightweight hull, it could certainly not have done this under fire and would have been far too vulnerable to damage from mines, even if enemy action had ceased.

No description of the vehicle can do it justice without describing the unconventional axle and wheel layout in detail. Although it was described as a five-axle machine, this is not strictly true since the single wheels at front and rear were

actually only intended to assist with ditch crossing. For convenience, the axles carrying the single wheels can be referred to as front and rear, with the three centre axles described as centre-front, centre and centre-rear. The wheels on the three centre axles were disposed in such a way that those on the narrow-track centre-rear axle are nested into the wider-track centre axle, whilst the single wheel at the front is nested into the centre-front driving axle. The DTD engineers believed that the single axles, at front and rear, were a source of danger under conditions when the entire 4500 lb weight of the machine was suspended on them.

Whilst the centre axle is the only one with a differential, all of the axles are driven. The transmission is connected to the centre axle, with a triplex chain drive from this to the centre-front and centre-rear axles, and a similar arrangement of chains connecting these to the single wheels on the front and rear axles. The gear ratios selected for the chain drive ensured that all of the wheels rotated at the same speed,

regardless of being different sizes.

The front and rear axles were shod with a 9.00x13 Dunlop road tyre; the centre-front and centre-rear axles, both of solid design, carried 30x5 tyres with a fairly-aggressive tread; the centre axle was provided with a differential and carried 7.50x24 Firestone agricultural tyres. With the vehicle stationary, it sits on the wheels of the centre and centre-rear axles, with 6in clearance apparent beneath the wheels of the front axle, 3in under the wheels on the centre-front axle, and 1in under the rear axle.

In the interests of simplicity, there were no springs and no conventional steering gear. Suspension was provided by deformation of the tyres alone, whilst steering was by means of a braked differential operated by means of a tiller bar and acting only on the centre axle.

The main engine, mounted between the centre and centre-rear axles, was a four-cylinder Ford unit producing 24bhp and driving through an Opperman three-speed gearbox. The radiator was mounted above the hull with elevated air intakes to either side. A frame was fitted at the rear, designed to accept an outboard motor,



Since the driver is not evident in other views, one has to conclude that, in this case, the Scorpion has been defeated by the loose shingle and that the driver is attempting to extricate himself from the hull. (IWM, H19432)

almost certainly a British Anzani-powered unit, which provided propulsion in the water at less than 1mph.

There was rather cramped accommodation for a driver and commander; the latter would also have acted as gunner if the vehicle had been fitted with a turret. The single front wheel allowed the hull, which was of 1/2in armour steel plate to be brought to a point,



It was described as being amphibious but the driver had to lean out of the hull like this to start the auxiliary outboard motor - speed in water was at best 1 knot. (IWM, H19443)

rather like a boat.

Tests were carried out in early May 1942 - described as 'most secret' - and, in July 1942, the Scorpion was submitted to the Department of Tank Design (DTD) for what was described as 'a brief performance trial' using a Daimler Dingo scout car as a reference. Over a period of two days the Scorpion was to be tested 'across country, up steep slopes and in water' with the intention of identifying any weak areas of the design.

The first trials required that the Scorpion descend a 25° bank onto a narrow road and then proceed along the road to climb an 18° slope, slantwise, into a field. The

Scorpion made short work of this manoeuvre whilst the Dingo had to reverse after descending the bank. Next came a cross-country speed test where the Scorpion travelled at about 25mph over a rough field and, although it was highly manoeuvrable, the constant pitching must have made it most uncomfortable for the crew. On the next test which involved crossing a three-foot wide, two-foot deep, ditch the Dingo actually got itself stuck and the driver damaged the gearbox trying to get free, but the Scorpion was able to cross with ease since the axle layout meant that the vehicle remained in contact with both banks. The Scorpion also easily crossed a 20-yard patch of 18-inch deep mud from which the Dingo had to be towed out.

In a deep pond, the Scorpion showed that it could swim at a speed of about



This view of the Scorpion being loaded for the return journey clearly shows the radiator and air intakes. Presumably if a turret were fitted, it would be have been mounted on the circular structure on the top of the hull. (IWM, H19424)

The Scorpion shows what it is made of in fine sand which is both loose and dry. Note the nose-up attitude, even when at rest.
(IWM, H19437)



1 knot but was unable to turn, and steering had to be effected by grounding on the banks and using these to turn. Its amphibious performance was equally slow in a canal and it was unable to extricate itself across a 10in vertical rise. Obviously, the Dingo was not subjected to the amphibious trials.

On a bumpy gravel road, the Scorpion was able to travel at about 15-20mph before the fore-and-aft pitching caused it to swerve violently and for the driver to lose control. A concrete gradient of 1:2.25 was successfully climbed as was a gravel slope of 1:2.98. On soft sand, the vehicle became suspended on the single wheels of the front and rear axles and, in attempting to extricate it, the gearbox was damaged and the oil lost, resulting in it having to be towed out. A universal carrier crossed the same sand nullah with comparative ease.

Despite the fact that the Scorpion boiled its cooling water during the majority of the trial, which led to the comment that 'the cooling is unsatisfactory', the officer in charge was reasonably impressed with Opperman's weird machine. In writing a report of the trials, he concluded that it had a 'very good cross country performance for a wheeled vehicle' but doubted that a 'vehicle without suspension would prove reliable' going on to say that if 'some form of independent suspension was employed... the riding and steering qualities would be improved without affecting its capabilities as an amphibian'.

At the conclusion of the trials, DTD recommended that the 'project be closed' but, interestingly, there was some dissent with this view, and the officer originating the project defended the Scorpion as being 'novel and interesting... (with) an essentially simple and rugged design'. An experimental Mk 2 Scorpion was ordered in which Opperman was said to be improving the cooling arrangements and incorporating some form of differential lock, but what became of this, if it was built, is not known. It seems that, although no more examples were constructed, TT2 was never one to look a gift horse in the mouth and the principles of skid steering by means of a braked differential, and suspension by

S E Opperman Limited

Although by the time War broke out in 1939, Opperman was a long-established name in the engineering world, the Company is not one traditionally associated with producing military vehicles, and these days is probably not well known for its other products either.


Originally established in 1860 by Carl D. Opperman in London's Clerkenwell district, the Company started out as gear cutters and soon established a reputation as general engineers. In 1940, the Company, having been trading as S E Opperman Limited since 1905, moved to new premises at Stirling Corner, Borehamwood.

The Scorpion must have given the Company a taste for producing wheeled vehicles. In 1947, the three-wheeled agricultural Motocart was introduced and, in 1956, a four-wheeled microcar was produced under the name Unicar. It was powered by a rear-mounted two-cylinder British Anzani engine of 325cc, and subsequently by a 328cc Excelsior unit, driving a solid rear axle suspended on trailing arms. It was extremely light in weight, due to its unorthodox construction which consisted of a tubular sub-frame combined with alloy pressings and six glassfibre-composite mouldings which were bolted and bonded together to form a semi-monocoque body - at £399.50, it was the cheapest car at the 1956 London Motor Show. Approximately 200 examples were produced between 1956 and 1959, and in 1958 the Unicar was joined by the rather more sporty Stirling coupe of which far fewer were built.

Opperman announced a deal with the Austrian firm Steyr-Puch for the supply of a 493cc unit which would have improved the performance of the Stirling but the all-conquering BMC Mini put paid to that idea and the Company did not survive into the new decade.

means of the tyres alone, were borrowed from the Scorpion for the Thornycroft Terrapin and after the War, the same approach was used on the TV1000

experimental Rhino.

So, perhaps it wasn't quite another of those inevitable blind alleys on the road to automotive nirvana but it wasn't far off. 



Ooo...er... in wet sand, the multiple wheelbases of the Scorpion leave a very distinctive trail.
(IWM, H19428)