

Little and Large

Two of the best known
British vehicles of World War
Two are seen restored and running in West Yorkshire

When Britain went to war with Germany in 1939, the country was not as well prepared for battle as history would lead us to believe. Certainly, as far as its military vehicles were concerned, the United Kingdom found itself requisitioning a whole host of civilian trucks, light vehicles and motorcycles and adapting them for military service.

Drawing on existing projects, the War Office also commissioned and tested wheeled vehicles throughout the 1930s at the Mechanical Warfare Experimental Establishment (MWEE) at Farnborough, which, during the war, would become The Wheeled Vehicles Experimental Establishment (WVEE), moving to Chertsey in 1943.

Both the vehicles featured here began life as commercial trucks and were subjected to military testing and modification, the innovative Scammell Pioneer having undergone close scrutiny during its development throughout the 1920s and '30s. However, the Bedford 'O' Series civilian trucks had only just been introduced in 1939 after a company revamp of their civilian offering and were rapidly requisitioned for military use on the outbreak of war on September 1 1939.

The Bedford OXD currently in Mike Shackleton's care was originally restored some years ago and is one of only three known to be running in the UK. The stunning



*'As the war proceeded,
aluminium became scarce and was prioritised
for aircraft'*

Pioneer 2V/2S Heavy Breakdown Tractor, seen here using its jib and winch, has recently been beautifully and painstakingly restored by John Pickersgill with invaluable help from his team of volunteers, John Bramfitt and Norris Davison.

Supplying almost 250,000 vehicles, Bedford accounted for the highest number of British trucks during the war. Most numerous was the 'O' Series, with more than 72,000 examples of the three-ton OY and 24,428 30 cwt (1.5-ton) OX models built over the course of the war. Others included the specially designed military four-wheel drive QL, introduced in 1941, anticipating later cab design by seating the driver above the engine and the 15-cwt 4x2 MW, an even smaller general service transport vehicle which resembled the larger OY and OX in its front aspect.

Britain would lose all but a very few of its first 1939 and 1940 Bedford OX trucks in the Dunkirk evacuation between May 26 and June 4, 1940. Scammell too would lose a significant number of their artillery tractors and some SV/2S recovery tractors to a very appreciative Third Reich. However, unlike the Bedford OXD general service lorry, the Scammell

Pioneer SV/2S heavy recovery tractor not only enjoyed post-war success in the commercial field from which it had come, but could be found still in service into the 1960s and as late as 1984 in Belize. Sadly, after the war ended the hard-worked OXD was of no further use to the army and was run into the ground by civilian users both in Britain and across Europe, leaving few survivors for present day restorers to cherish.

The diminutive Bedford OXD four-wheeled 4x2 General Service lorry with its steel panel cab seating two in sparse comfort was produced in relatively small

numbers compared with the larger OY three-ton six-wheeled general service truck, the latter class being more suited to War Office needs as the war progressed. The OY was roughly equivalent to the ubiquitous American GMC CCKW 2.5 ton 'deuce and a half' which came to characterise large scale transportation of men



Both derived from commercial designs, the Scammell Pioneer's styling dates back to pre-1920s and the Model T Ford while the Bedford OXD's style is more streamlined, characteristic of the late 1930s and features sliding door windows

BOTTOM RIGHT: The flat-grilled Bedford OXD's markings indicate it was assigned to an RASC unit attached to 50 (Tyne-Tees) division. The civilian registration number is presumed to have been allocated when the vehicle was demobbed around 1950

BOTTOM MIDDLE: Mike Shackleton's Bedford OXD general service lorry is one of only three known restored examples in the UK; note the military crash bar and cut out engine panel vents, the latter cheaper to construct than earlier mesh ones

BOTTOM LEFT: With its well-maintained rear canvas, Mike Shackleton's OXD was restored during the 1980s and provides compact load space; note the circular holes cut as steps in the tailgate for troops to access the rear

BELOW: The four-wheeled short wheelbase Bedford OXD GS 30cwt lorry was used in all theatres of operation during World War Two but was a less useful size and therefore less plentiful than the larger three-ton Bedford OY



SPECIFICATIONS

Make **Bedford**
 Model **OXD**
 Nationality **British**
 Year **1940**
 Production Run **1940-1945**
 total **22428**
 Engine **Bedford**
 Type **Six cylinder type WD OHV**
 Fuel **Petrol**
 Displacement **3,519cc**
 Power **72bhp at 3000rpm**
 (16.45 bhp/ton at governed 2,580rpm)
 Torque **161lb/ft at 1200 rpm**
 Transmission **Bedford**
 Type **Four speed**
 Gears **Four forward, one reverse**
 Transfer Box **None**
 Suspension **Front and rear semi-elliptic with hydraulic shock absorbers all round**
 Brakes **Foot; hydraulic vacuum servo-assisted on all wheels Hand; mechanical on rear wheels only**
 Wheels **Steel disc two-part**
 Tyres **10.50 x16**
 Crew/seats **Two in cab, in the rear of GS**
 Weight **Two tons 11 ¾cwt**

Dimensions(overall)
 Length **194 ¾in**
 Width **85 ½in**
 Wheelbase **111in**

THE MAGNIFICENT GARDNER 6LW ENGINE



The Gardner 6LW 8396cc direct-injection diesel engine was, modern, simple to operate and maintain and innovative and was specified by the War Office in many military vehicles; John's is a later war unit with cast iron crank, sump and cases as aluminium was scarce

Joseph Gardner already enjoyed a reputation for reliable, versatile and freshly-designed diesel engines when the company produced the 6LW. Its predecessor, the L2, launched in 1929, had been developed for marine applications but readily transferred to the commercial automotive

market resulting in economy as well as efficiency. Gardner was looking for further efficiencies when he refined the unit for buses and revealed the 6LW in 1931, a lighter, smaller unit that packed a much greater punch. One exhaust valve per cylinder and cam-driven levers,

pushrods and tappets to operate the valves and a single sprayer injecting diesel between the valves and into the cylinder it was less complex and easier to maintain, as well as being available in four, five and six-cylinder configurations.

The improved design of the piston crown and combustion chamber meant more complete fuel combustion and hence more economy. It was only to be expected that the War Office should test the engine for reliability, durability and ease of starting, and on mobility trials in North Wales in 1937 it passed with flying colours. The 8,396cc 6LW was the natural choice for the Scammell Pioneer.

In the original design, for greater efficiency, aluminium alloy was used in place of cast iron for the sump and crankcase and light steel for the flywheel. However as the war proceeded, aluminium became scarce and was prioritised for aircraft, meaning crankcases and sumps were once again made from cast iron (as the 6LW in John's Pioneer has) until a couple of years after the war had ended.

and supplies across all theatres of operation in World War Two.

When the War Office requisitioned the first civilian OX trucks at the beginning of the war they set about modifying them for military use. The chassis was strengthened and a flat, raised, sloping bonnet would accommodate the type of large air filter the War Office specified across its lorries. Mesh grilles were set in engine side panels to increase air flow, later replaced with simple vents to cut production costs. Initially, 34 x7 size tyres were specified but later these were changed to a 10.50 x 16 cross-country tyre fitted to larger divided Sankey W60 wheels with eight bolts. A crash bar protected the radiator and lights were set flush with the front panel.

As well as the General Service OXD with its timber or steel superstructure body, Bedford produced some as slave battery trucks, with more headroom and extended sides to provide assistance with starting for armoured and other important vehicles in the field. It also acted as a spare battery carrier and charging plant and as a minor repair facility for wiring and electrical equipment in the field. Two CAV 12-volt dynamos were mounted below the floor and, together with the 30-volt slave battery charging dynamo, were belt-driven by a gearbox-mounted power take-off. Equipped by Spurling Motor Bodies Ltd a number were refurbished after the war for the Danish Army.

SPECIFICATIONS

Make **Scammell**
 Model **Pioneer SV/2S**
 Nationality **British**
 Year **1942**
 Production Run **Total between 1939 and 1945, 1975**
 Engine **Gardner 6LW**
 Type **Direct injection four-stroke water-cooled in-line six cylinder OHV**
 Fuel **Diesel**
 Displacement **8396cc**
 Power **102bhp**
 Torque **358 lbs/ft**
 Transmission **Scammell**
 Type **Six-speed constant mesh**
 Gears **Six forward one reverse four neutral positions (to engage power take-off position is at neutral between second and third) final drive to centre of gear-cases on the rear bogies**
 Transfer box **None**
 Suspension **Single transverse leaf spring to front axle, 'walking beam' rear axle bogies pivots on rear axle**
 Brakes **No front brakes; servo-assisted drum brakes to rear wheels; hand operated contracting shoe transmission drum brake for emergencies**
 Wheels **20in four-piece pressed steel disc**
 Tyres **13.50 x 20 cross country bar grip**
 Crew/seats **Three**
 Weight **9838kg (unladen)**
Dimensions(overall)
 Length **6109mm (with jib extended 7811mm)**
 Width **2,590mm**
 Wheelbase **1302mm**

BELOW: With a shovel by each door and flawless deep bronze green semi-matt paint, the Scammell Pioneer is now prepared for military action, canvas roll down windows providing some weatherproofing for passengers and driver
BOTTOM RIGHT: John has sourced correct War Office specification bar grip tyres and when he acquired the SV/2S, it was missing its weight frame; this has been accurately fabricated from steel using a template
BOTTOM LEFT: The offside bumper sports the blue yellow and red striped REME arm of service sign, complementing the Allied white star on the driver's door, the latter a replacement made to a template



The Scammell Pioneer owes its exceptional off-road agility to clever design both in the front axle with its central single transverse eight-leaf spring above the axle giving 610mm travel and to the use of independently-gearred bogies attached to a massive worm-drive rear axle, both of which help protect the chassis from risk of torsion stress.
The rear axle was manufactured

One freshly shot-blasted short wheelbase Scammell Pioneer chassis awaiting the vehicle's rebuild in 2010



SCAMMELL'S 'WALKING-BEAM' SUSPENSION EXPLAINED

by Kirkstall Forge Engineering in Leeds which is now closed - bought out by GKN and shut in 1974. They produced many axles for military vehicles during both world wars. Final drive at the rear was achieved through 'walking-beam' gearcases, each of which carried two wheels and pivoted centrally from the axle. Spur gears on the axle half-shafts drove the wheels via idler gears to a spur gear on each wheel. As a result, the rear wheels on each side can travel independently up approximately 300mm along a vertical plane.
The 'walking beam' design was patented by Scammell in the 1920s and continued with slight updating in 1939 in their military vehicle range for more than 30 years and was continued into the Leyland Martian range of vehicles (FV1100) into the 1950s.



Dave Bramfitt supervises while admiring the 'walking-beam' gear cases, now exposed in all their ingenious glory



Other Bedford OXs became mobile offices while quite a few were pressed into service as mobile canteens for the Queen's Messengers Convoy Food Flying Squad, a gift of the American Committee for Air Raid Relief.

The Bedford OXA was an interesting if primitive armoured variant with limited visibility and armed with a Bren gun and Boys anti-tank rifle it was issued to the Home Guard. Thankfully it didn't see action as neither it nor its occupants would have survived. Later, the OX's cab and chassis were put to use as a tractor for a semi-trailer known as the OXC, the work to convert these carried out by Scammell. Some of these were put to use transporting damaged aircraft.

However, if the Bedford was an everyday workhorse, the Scammell Pioneer in all its variants was without doubt one of the most impressive vehicles of World War Two, even after the American usurper, the Diamond T 980/981 took over most of its tank transportation duties.

Towering over every other wheeled military conveyance of the period, and with unrivalled articulation over rough terrain thanks to its patented rear axle configuration, the archaically styled vehicle was virtually unstoppable.

Development of the vehicle that was to become the Pioneer began in 1925 with a fully working prototype appearing in 1927, Percy

Hugh's innovative features encouraged by Oliver Danson North, design director at the time. Watford-based Scammell patented a 'walking-beam' rear suspension with the axle driven by a worm and wheel, which, together with a front axle centrally pivoted on a single transverse leaf spring, would put the vehicle at a huge advantage over others at the time.

Both front and rear wheels had the sort of degree of travel relative to both one another and to the chassis one sees in extreme off-road vehicles nowadays. This meant that the vehicle could crawl over very uneven terrain without putting any twisting strain on the rigid chassis. Until this point Scammell had only been producing articulated vehicles and this one could literally climb walls.

Tractor and trailer combinations were supplied to Venezuela, India, to oilfields across the Middle East and for geological exploration in Western Australia using Scammell's own six-cylinder petrol engine, the optional six-speed gearbox producing phenomenal torque. In first gear one could extract the vehicle from practically any ground conditions, with the engine at 1,000 rpm and the output shaft rotating only once every eight seconds.

In 1932, the War Office bought a tank transporter tractor from Scammell for testing which had a cab similar to the later production models. A powered winch was fitted for self-recovery but without modern hydraulics the business of low-loading was laborious and time-consuming. In 1937 a longer wheelbase version was produced along with a short wheelbase artillery tractor, the former featuring stronger springs and a more appropriate

'Without modern hydraulics the business of low-loading was laborious and time-consuming'

JOHN PICKERSGILL'S SCAMMELL PIONEER SV/2S

The hardworking team of three; from left to right Norris Davison, John Pickersgill and Dave Bramfitt



Based in West Yorkshire, John Pickersgill has a keen interest in old vehicles, particularly those concerned with heavy haulage and plant rather than military transportation. Keen to restore and own a Scammell Pioneer he came across this SV/2S advertised in a classic commercial publication in 2009. The recovery truck fitted his budget and superficially looked fairly tidy - if in need of new boarding to the cab floor. The owner had even polished the brass handles. Once home though and on closer inspection the Pioneer required complete restoration to all parts. Gathering parts and with help and advice from

Dave and Mandy Weedon who also own a number of Scammells, work began in 2010 with the all-important rear axle. John Bramfitt, a local engineer, brought his expertise with building shafts to the task, dismantled the bogies and by skilfully using metal spray, restored the metal surfaces to their original tolerances. The complex 'walking beam' axles refurbished, reconstructing badly worn brakes followed. With all components removed, the bare chassis was shot-blasted in the open air along with the wheels. The engine presented a more complex challenge as it required careful re-building, the cast iron block more diffi-

cult to work with than the aluminium it would have been made of if not for wartime shortages. It took three years of painstaking work to recondition as some parts were missing. John is indebted to Paul Hopps, a retired mechanic from the Keighley Bus Museum who volunteered to finish the job, fitting six new pistons, reconditioning the cylinder head and block. Hindle Reman of Bradford re-machined the worn crank and crankcases, white metal bearings found to suit the crank. John found too that Gardner Marine of Kent, the original makers of the 6LW were, still able to supply suitable parts and advice. They even have 6LW engines on their website awaiting overhaul. Curiously, the Scammell gearbox was the only part of the vehicle that needed only a clean, oil and a quick check over. By now it was 2013 and four years into the restoration. Norris Davison, a keen model engineer helped John re-board the cab and construct the rear body lockers from Keruing timber, a type of hardwood from Indonesia and used commonly in lorry bodies. The main rear body was re-made from softwood as it would have been in 1942 and painted, the original cappings and hinges blasted and refurbished. The carpentry alone took six to nine months of hard work and careful measuring. Additionally, the cab had arrived with the wrong doors and using a friend's

Scammell door as a template, John constructed a new set. Likewise, a front weight frame was fabricated from scratch using a pattern taken from the same recovery truck. Finding an original Scammell workshop manual was completely invaluable for identifying oils, setting tolerances and as a source when rewiring the truck. With chassis number 4757 John was able to pinpoint his Scammell to contract number S832, which meant it was supplied to the War Department after August 31, 1942. John also had an elderly friend, Harry Richards, who sadly died recently at 92, and who would entertain him with tales of his exploits with REME during the war, driving the massive Pioneers in Italy - despite his short stature. Sadly, he never saw it finished and John is planning to name the SV/2S 'Little Harry' after his friend, sign-written above the windscreen. Likewise, he plans to add an 11th Armoured Division formation sign, that of the black bull, partly as one of John's work-roles is as dairy farmer. Dedicated to: 'Little' Harry Richards

Thanks to:
Dave Bramfitt and Norris Davison
Dave and Mandy Weedon
Ashley Walker
Paul Hopps
Phil Morgan

MIKE SHACKLETON'S OXD

Although generally simple and reliable, running the OXD over the past seven years has had its moments. In 2013 a can of worms opened when the exhaust manifold sprang a leak which resulted in an engine rebuild and while Bedford parts are plentiful and interchangeable, the replacement plus sixty thou pistons were a shock at £585 plus VAT. Ignition coil failure too is an intermittent problem as it is also on the QL. The ignition coil tends to overheat and Mike keeps a spare coil handy in the cab. In common with some other vintage vehicles the OXD also experiences the drawbacks of vacuum-operated windscreen wipers which mean that the harder the engine works, the slower they go. As well as the coil, modern compromises include tyres, halogen bulbs, rear reflectors, modern rear lights and indicators, with the switch on the dash, together with a cartridge oil filter which is cunningly

housed within the original housing. The OXD has proved its worth and surprised Mike, who says: "For a two-wheel-drive vehicle, it is surprisingly able in off-road conditions. At the inaugural Yorkshire Wartime Experience a few years ago, the site was waterlogged when a month's worth of rain fell in 24 hours. My OX travelled the length of the site on at least half a dozen occasions and while there was a fair amount of slipping and sliding, it did not once get bogged down!"

Thanks to:
Fellow World War Two re-enactors who brought the Scammell 'recovery' to life for the camera...
David Shackleton,
Jess McGreal
Matthew Widdop
Jack Sharples

Proud owner and son left to right; David Shackleton and Mike Shackleton



ABOVE: The Bedford OXD's six-cylinder WD OHV 3,519cc petrol engine is simple to maintain though ignition coils failing are a problem at the moment

ABOVE MIDDLE: The Bedford OXD driver's windscreen section was once capable of opening but during restoration was sealed shut while thirties civilian styling abounds in the simple cab, the civilian model door linings are ribbed for strength

ABOVE RIGHT: The leather-lined holders between the canvas upholstered seats are to restrain two rifles



rear axle configuration for the job of transporting tanks.

Meanwhile, the War Office, finding little need for recovery vehicles in the inter-war years dragged its feet and only in 1936 was a contract drawn up for ten purpose-built 'tractor, heavy breakdown' units from Scammell designated SV/1S or SV/1T. The vehicle was fitted with a narrow, collapsible 'A' frame carrying a jib which could be folded back into the body when travelling, the job rated at two tons when extended and three in the inner position. It proved awkward in use. By this time the Gardner 6LW engine was fitted to all Pioneer recovery trucks, driving the rear bogie through a six-speed Scammell gearbox.

Like the SV/1S the SV/2S which followed in 1939 had a timber rear body with storage lockers either side of the jib but was fitted with a more flexible two-position sliding jib crane, again rated at two and three tons depending on position and supplied by Herbert Morris. The 'A' frame remained fixed for strength, bolt-

ed to the rear body panel and braced onto the chassis. An extending jib section slid out to two positions increasing reach or height. This was all hand-operated by a three-man crew using chains and Morris winding gear. As well as carrying a rigid tow bar and distance frame, an eight-ton vertical spindle, worm-gear lifting winch was fitted underneath the floor of the timber body on both models. Up to seven removable counterweights, each weighing 70kg could be carried in a steel bracket mounted ahead of the radiator to balance a suspended load. Standard War Office draw gear was also fitted front and rear on heavy-weight spring mounts.

After a slow start in 1939 and following the Dunkirk evacuation of the British Expeditionary Force in 1940, production stepped up to four a month, but while an eventual total of 1975 SV/2S recovery trucks were produced during World War Two, supply never quite matched demand. Additionally, the twin-boom Holmes wrecking gear fitted to the

US-built Ward La France, Kenworth and Diamond T recovery vehicles proved more versatile and capable with complex recovery operations and heavier vehicles. However, despite its top-end speed of 35-38km/hr (24mph) at its lightest, the Scammell Pioneer was viewed by the War Office as having the greatest scope of any vehicle in the service and has become, justifiably, a legend, with the SV/2S the longest serving variant, often seen alongside its successor, the Scammell Explorer. ◀

Further Reading

British Military Trucks of World War Two, Les Freathy, Tankograd Publishing 2012 ISBN 978-3-936519-29-7

Pioneer The Scammell R100, SV1 and SV2, TRMU20 & TRMU30 in British Army Service, Pat Ware, Warehouse Publications 1998 (a very rare book, listed as available at the British Library) ISBN 0-9525563-8-3