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The FV 432 Series  
by Christopher F. Foss



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- 51 **The Abbot**  
*by Christopher F. Foss*
- 52 **M47 Patton**  
*by Colonel Robert J. Icks*
- 53 **FV 432**  
*by Christopher F. Foss*

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FV432 of the 1st Battalion The Royal Regiment of Wales on a training exercise in Germany.

(COI/CCR)

# The FV432 Series

by Christopher F Foss

## POST WORLD WAR II BRITISH CARRIER DEVELOPMENT

BRITISH carrier development up to the end of the Second World War is described in the Profile on Carriers. After the War the British Army continued to use the American half-track as well as Universal Carriers.

Many experimental carriers were built but only the wheeled Saracen Armoured Personnel Carrier (APC) reached the production stage. Whilst the Saracen was an excellent vehicle, it did not have the capability to keep up with tanks across country. Other carriers developed included the following series:

### FV3904 Churchill VII APC

This was a post-war version and was basically a Churchill without a turret. The troop compartment was open topped, although a small superstructure was provided forward.

### Oxford

About 400 of these were built shortly after the end of the War by the MG Car Company at Abingdon. They were used for various rôles including mounting a mortar or towing the 6-pdr. or 17-pdr. anti-tank guns. The Oxford was also called the Carrier, Tracked, C.T.20.

### FV401 Cambridge

This was built in prototype form in 1950, and was also known as the Carrier, Universal No. 4. It had four road wheels, torsion bar suspension, driving sprocket at the front, Rolls-Royce B-80 petrol engine at the rear, and a Wilson type epicyclic transmission. The crew compartment was at the front of the vehicle, the roof being provided with four hinged covers. The crew's only means of entry and exit was via the roof. Basic data of the FV401 was:

Length: 15' 4"  
Height: 5' 6½"  
Crew: 7

Width: 8' 4½"  
Speed: 35 m.p.h.  
Weight: 21,280 lbs. (loaded)

Max. Armour thickness: 12 mm.

Other members of the family were to have included the following, some of which were built in prototype form:

**FV402** Armoured Observation Post Team Carrier (TN20 Hobbs Transmission, crew 5, weight loaded 18,480 lbs., length 15' 4", width 8' 4½", height 6' 7½", speed 35 m.p.h.).

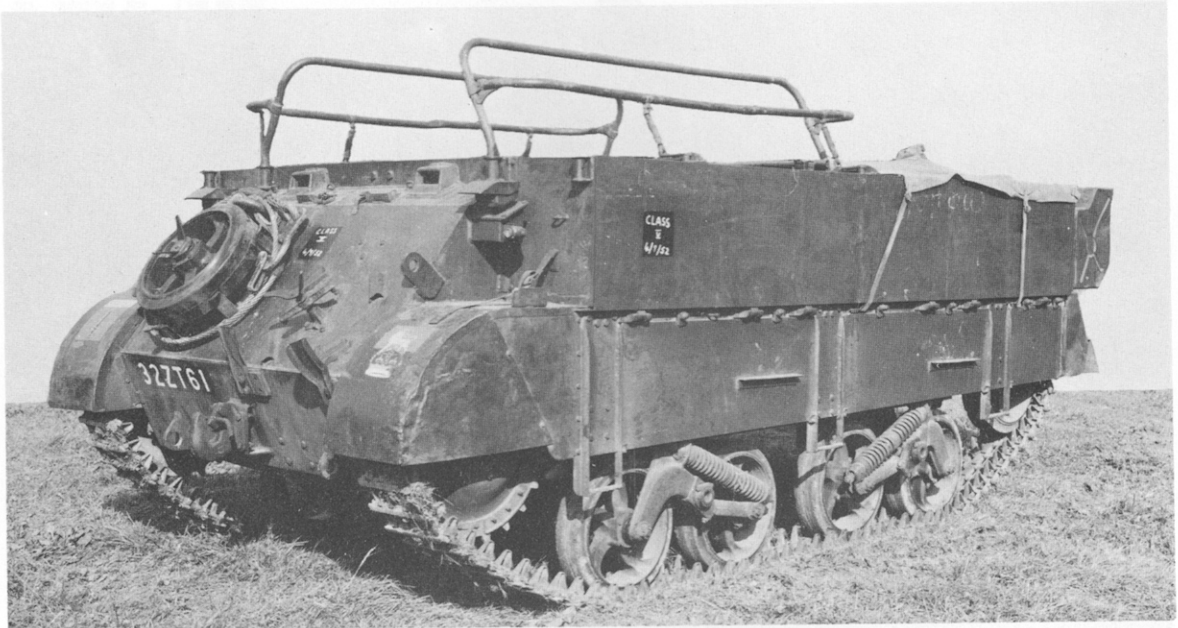
**FV403** Tractor, Light, Anti-Tank, Artillery

**FV404** Charging Vehicle

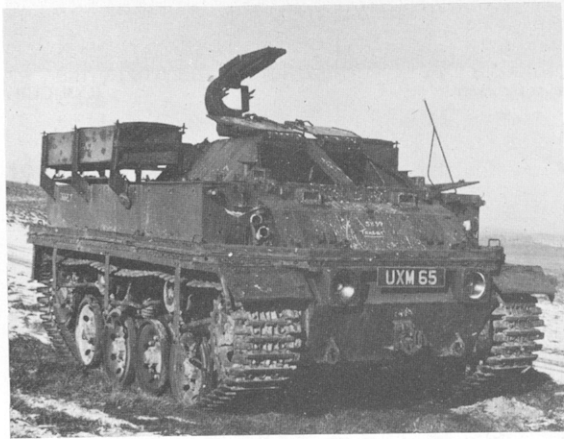
**FV405** Light General Purpose Carrier

**FV406** Command Vehicle

**FV407** Tentacle, ASSU (Air Cooperation Signals)



The Oxford Carrier Mark I (Carrier, Tracked, C.T. 20) which was used to tow the 17-pounder anti-tank gun.

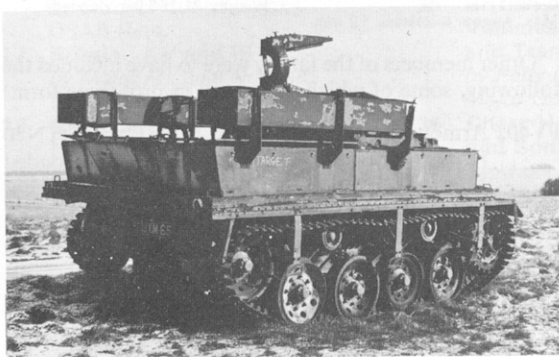


Three-quarter right front view of one of the FV400 series vehicles used for trials.



One of the FV400 series vehicles derelict at Lulworth, Dorset.

Three-quarter right rear view of one of the FV400 series vehicles used originally for trials and later as a hard target on a range.



FV401 Cambridge (also known as the Carrier, Universal No. 4) with flotation screen erected.



**FV408** Armoured Ambulance. This was to be 2 feet longer than the basic vehicle and was to carry 2 sitting patients, 2 stretcher patients plus crew.

**FV409** Gun Position Officer/Command Post Vehicle.

#### **FV500s**

This series was developed in the 1940s at the same time as the FV400s. The vehicles were to be fully amphibious but it was found that the FV400s could be made amphibious so work on the FV500s was stopped. (An FV401 Cambridge was fitted with a flotation screen similar to that fitted to the FV432). The FV500 series included:

**FV501** Tracked Load Carrier (Neptune)

**FV502** Tracked Workshop Vehicle

**FV503** Tracked ARV

#### **FV300s**

Development of the FV300s started during World War II. The first vehicle was the FV301, a light tank armed with a 77 mm. gun and powered by a Meteorite V-8 petrol engine. A chassis was completed for running trials, but the whole series was cancelled in the early 1950s. Other versions were to have included:

**FV302** Gun Position Officer/Command Post Vehicle

**FV303** 20-pdr. Self-Propelled Anti-Tank Gun

**FV304** 25-pdr. Self-Propelled Gun

**FV305** 5.5 in. Self-Propelled Gun (Trial mount was put on a Crusader Tractor)

**FV306** Light Armoured Recovery Vehicle

**FV307** Radar or WT (Wireless) Vehicle

**FV308** Tractor Field Artillery

**FV309** Section Vehicle Royal Artillery

**FV310** Armoured Personnel Carrier

**FV311** Armoured Load Carrier

#### **FV420 series**

This was developed in the 1950s and was the fore-runner of the present FV432 series. Vehicles in the series included:

**FV421** Load Carrier

**FV422** Armoured Personnel Carrier

**FV423** Command Vehicle

**FV424** Royal Engineers Section Vehicle

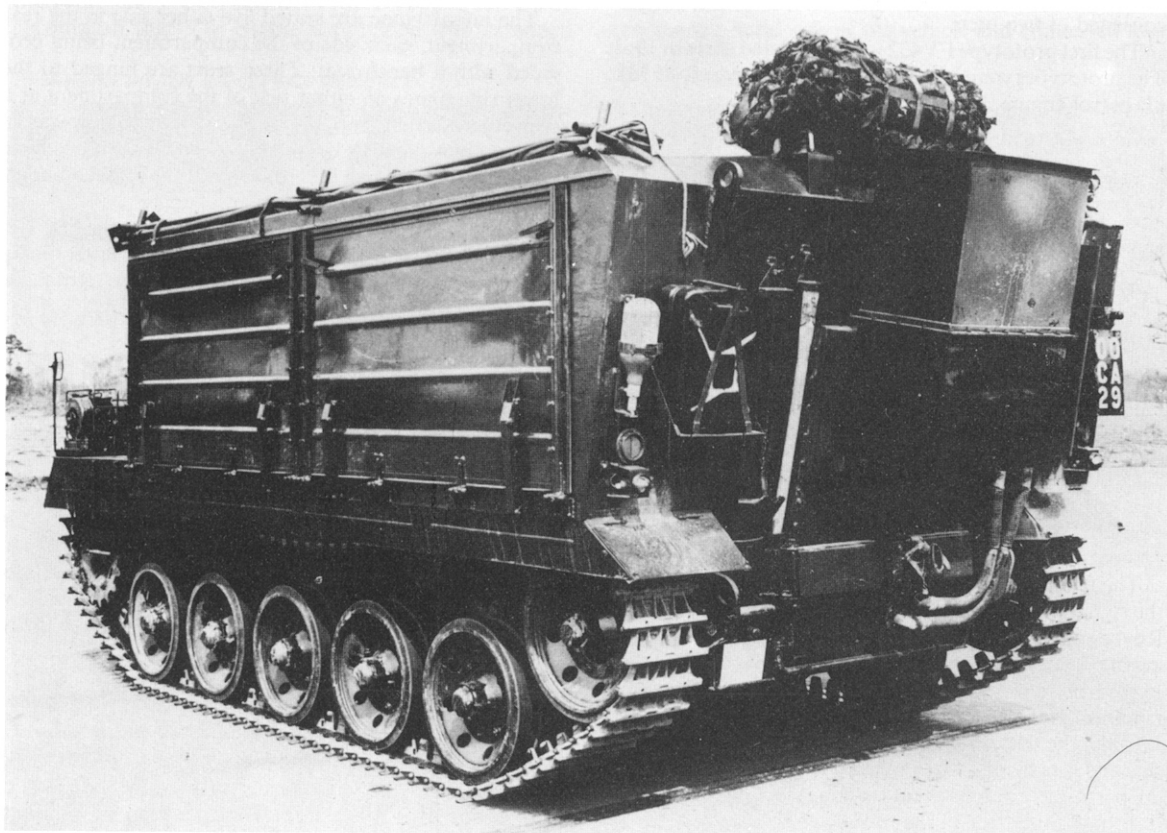
**FV425** Royal Electrical and Mechanical Engineers Section Vehicle

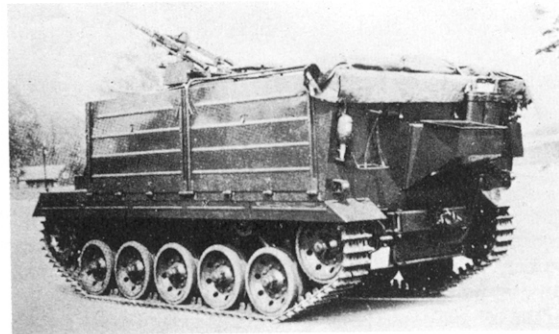
**FV426** Orange William Anti-Tank Guided Weapon Vehicle.

Full data on the FV421 is given in the table at the end of this Profile. The FV421 could carry a load of 5 tons or be fitted with special racks to carry ammunition. It was fully amphibious without preparation, being propelled in the water by its tracks. The engine, gearbox, radiator and engine air cooler could be removed from the vehicle as a complete unit, the unit being mounted centrally in the vehicle. The hull floor was of double construction, the torsion bars being housed between the floors. The sides of the vehicle could be easily lowered to facilitate loading, and rubber inserts were provided to make a watertight seal. At the rear of the vehicle was the duct for the discharge of the cooling air and exhaust pipes were also at the rear. The driver was in the front of the vehicle and was provided with a driving screen and a wiper. Entry to the cab was via a door over the left hand track guard.

*Three-quarter left rear view of FV421 Load Carrier.*

(RAC Tank Museum)





Three-quarter left front view of FV421 with ammunition racks fitted. (CCR)

FV421 in semi-derelict condition without tracks at Lulworth, Dorset.

Three-quarter left rear view of FV421 with armament.

### FV430 Series

Development of this series started in the late 1950s and was based on experience obtained from the FV420 series. The first version was the FV431 load carrier. This used the same components as the FV432 series but only the cab was armoured. The rear part of the vehicle could be removed and the nominal load was 3 tons. The crew consisted of two men.

The first prototype FV432 was completed early in 1961. The prototypes were powered by a Rolls-Royce B-81 Mk. 8F petrol engine. Basic data was:

Length overall: 16' 9"	Height to top of hull: 6' 2"
Width: 8' 8"	Ground Clearance: 1' 4"
Track Centres: 7' 2"	Ground Pressure: 10.52 p.s.i.
Weight unladen: 28,000 lbs.	Weight laden: 31,500 lbs.
Weight air-portable: 26,500 lbs.	

The first production order for the vehicle was given to GKN Sankey Limited of Wellington, Shropshire, in 1962. The same firm also built the FV434.

### DESCRIPTION OF THE FV432

The FV432 is built of welded steel plates which provide protection against small arms fire, shell fragments and flash burns. The vehicle in its APC rôle carries a total of 12 men: driver at the front right hand side, commander behind the driver and the 10 infantrymen in the rear compartment.

The front of the vehicle houses the driving position on the right hand side, and on the left hand side is the Rolls-Royce engine. The steering unit is mounted in front of the engine, access to this unit being achieved through a hinged plate on the glacis plate, behind the buoyancy trimmer. Normal means of entry for the infantrymen is through the rear door, which is hinged on the right hand side and is provided with an armoured vision block. Over the personnel compartment is a four piece circular hatch; this folds either side of the roof when the need arises.

The commander is provided with a cupola which can be rotated through 360 degrees; it has three periscopes (AFV32 Mark 1), and a single circular hatch cover is provided. The driver has a single hatch that is hinged on the left, and he has an AFV No. 33 Mk. 1 wide angle periscope. All doors and hatches are sealed against water and dust.

The infantrymen are seated five either side in the rear compartment, each side of the compartment being provided with a bench seat. These seats are hinged to the lower side plates on either side of the compartment at a convenient height from the floor and they fold upwards. This enables them to be quickly stowed and the vehicle can then be adopted for other rôles. The space underneath the seats can be used to stow kit etc.

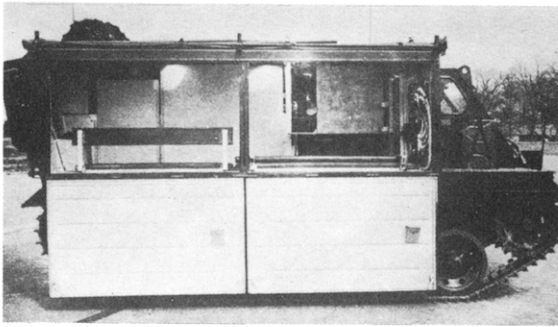
First vehicles were the Mk. 1/1 followed by the Mk. 1/2. Later came the Mk. 2 and Mk. 2/1, the latter being recognizable by the fact that the filters on the right hand side of the vehicle are let into the side.

### ARMAMENT

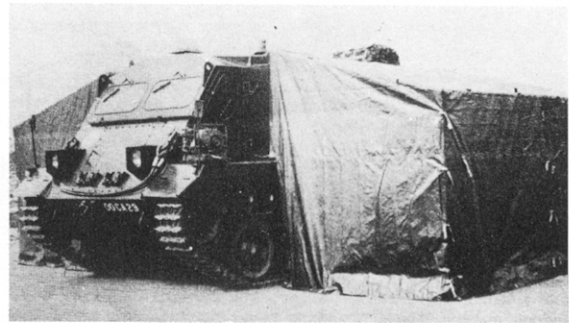
The vehicle is armed either with a 7.62 mm. GPMG mounted on the commander's cupola, or a LMG (Bren converted to fire the 7.62 mm. round). Eight boxes of 200 rounds are carried for the GPMG, or 50 magazines of 28 rounds each for the Bren. At present the commander has no armour protection whilst firing his weapon, but this may be remedied in the future. In addition a three-barreled smoke discharger is mounted on either side of the front glacis plate. Some of the infantrymen could fire their weapons by standing up in the roof hatch.

### ENGINE

The vehicle is powered by a Rolls-Royce K60 No. 4 Mk. 4F engine. This is a six-cylinder twin crankshaft, vertically opposed piston, compression ignition power unit,



*Side view of FV423 Command Vehicle showing basic interior.*



*Three-quarter left front view of FV423 Carrier, Tracked, Command, with side penthouse tents erected.*

and is mounted near the front left hand side of the vehicle. It operates on a uniflow, pressure scavenged, two stroke cycle and develops 240 b.h.p. (gross) at 3750 r.p.m. Maximum torque is 52.38 kg.f. (379 lb. ft.) at 2500 r.p.m. The engine will operate on a wide range of fuel including JP4, 80 octane petrol, diesel oil or aviation kerosene. It is, however, most economical when operating on fuel oil only.

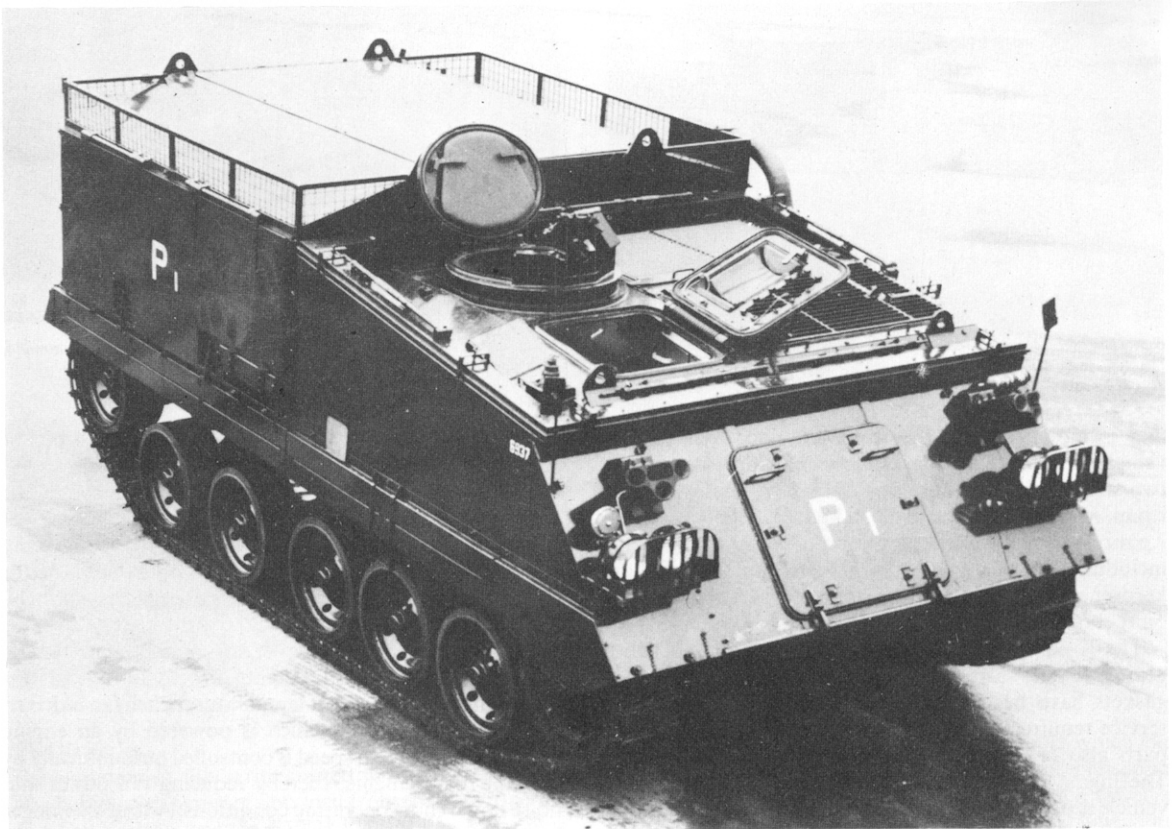
The K-60 is a simple engine as the valves and valve gear, rockers, tappets, pushrods and cylinder head gaskets have been eliminated. This minimizes routine service requirements. The marked reduction of moving parts also reduces the number of spare parts required. The engine weighs approximately 1600 lbs. and gives the vehicle a power-to-weight ratio of 16.15 b.h.p./ton. The power pack measures 42" long, 27" wide and 30" high. It contains the engine, oil tank and filters and is mounted on a sub-frame for easy removal from the vehicle, through the roof. The FV434 REME Fitters Vehicle can easily accomplish this. The engine is provided with extended

cables and fuel lines which enables the engine to be test run whilst alongside the vehicle.

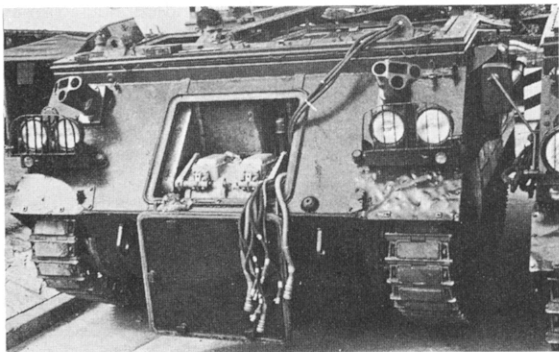
Air for cooling the engine is drawn in through the chevron type louvres on the left hand hull roof, the inlet louvres being the forward ones and the rear ones being the outlet. The air is drawn to a two pass flow radiator situated over the power unit and is expelled upwards by the vertical axis fans below the outlet louvres. This system has the advantage of air uncontaminated by engine compartment oil, flowing directly to the radiator matrix at near an ambient temperature. Each fan is driven by a hydraulic motor which is powered by an engine mounted pump. Fan speed is controlled automatically by coolant requirements, thereby reducing fan power and noise under most operating conditions. A heat exchanger is provided which consists of four separate sections in-line to cool the engine, hydraulic steering unit and gearbox oils. A cyclone-type air cleaner is mounted on the engine frame. A front take-off exhaust manifold is fitted on the left hand side of the vehicle and connected to an

*Three-quarter left front view of FV431 Load Carrier.*



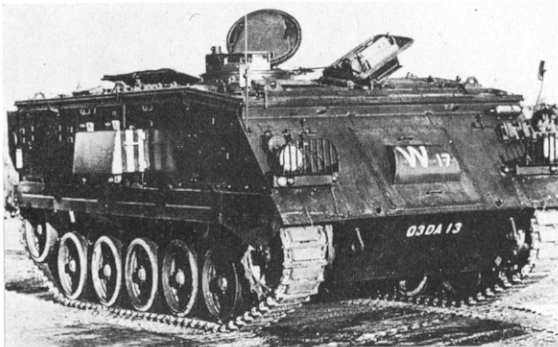


*Three-quarter right front view of FV431 Load Carrier Prototype.*



*Close up of FV432 with its front plate open. Note the engine extension leads.* (C. F. Foss)

*Three-quarter right front view of early FV432, originally called Trojan.*

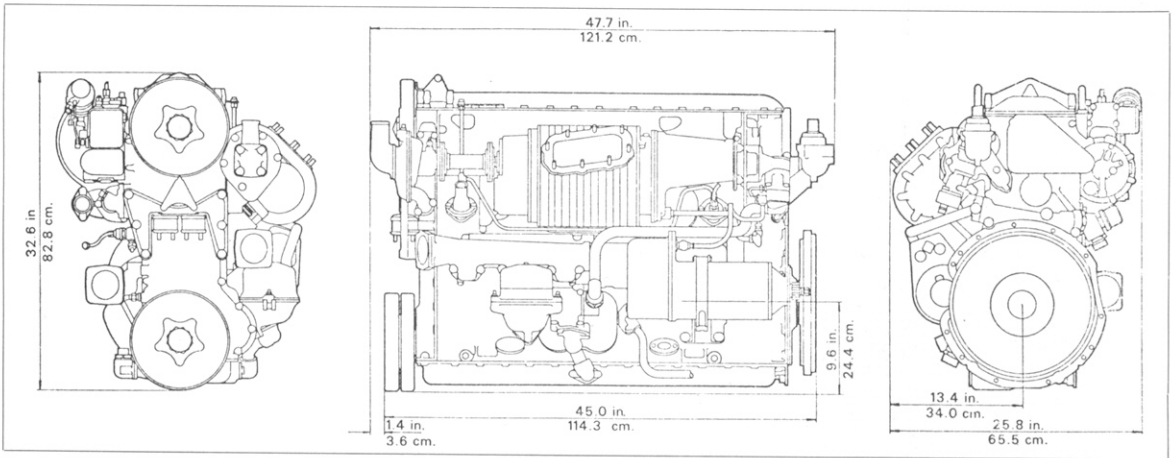


externally mounted silencer on the left hand side. Vehicles may however be seen with their exhaust pipes on the roof. The main fuel tanks, which hold a total of 100 gallons, are mounted at the rear of the compartment, one either side of the pannier floor. The K60 engine is also used in the Abbot Self-Propelled Gun, the Swedish Strv103 (S-tank) and Swedish 155 mm. Self-Propelled Gun. In the case of the Swedish vehicles the K-60 is used together with another engine.

### STEERING UNIT/FINAL DRIVE

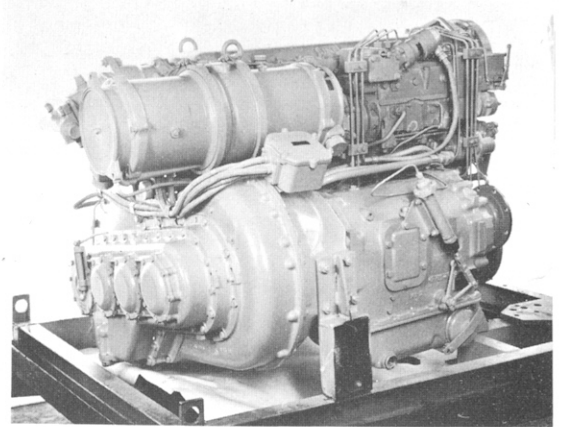
The steering unit is mounted in the front of the engine compartment, behind the glacis plate, and is coupled to the transmission by a universally jointed propeller shaft. It incorporates a bevel reduction gear of 2.07 : 1 between input shaft and differential unit. The driver's steering control levers operate flexible bands engaging on 15" diameter drums through a mechanical linkage. Lubrication and cooling of the steering unit is arranged on the dry sump principle. A pressure pump draws oil from a separate oil tank with a defrothing screen incorporated, and supplies lubrication to gears and bearings, and cooling oil sprays on the brakes. The two final drive units each receive power from the differential and transmit this power to the track drive sprockets. Each final drive consists of a single spur reduction unit to an output shaft. The track drive sprockets are bolted to the output shafts. The drive is through a transfer box to an Allison TX-200-4A semi-automatic gearbox (built under licence in England by Rolls-Royce) with 6 forward and one reverse





Outline drawing of the Rolls-Royce K60 engine as fitted in the FV432.  
(Rolls-Royce Motors Limited)

Rolls-Royce K60 engine as used in the FV432.  
(Rolls-Royce Motors Limited)



FV432 (then called Trojan) with roof hatches closed at Bovington, Dorset, in 1967.  
(C. F. Foss)





Front view of FV432 with no trim board on front of vehicle.  
(Sperry Rand Limited)

Three-quarter left rear view of FV432 with extension fitted to exhaust pipe.  
(C. F. Foss)



gears, with a torque converter operating in 1st, 3rd and reverse. The transfer box is bolted to the rear (output end) of the engine. A four-gear train provides power transfer from the engine to the transmission at a ratio of 1:1. There is manually controlled disconnecting dog clutch for isolating the transmission from the engine. This facilitates starting in extreme cold conditions.

### SUSPENSION AND TRACKS

The FV432 has torsion bar suspension with ten individually sprung dual rubber tyred road wheels. There are five road wheels (each 24" in diameter) and one idler wheel assembly on a 13½" wide track each side of the vehicle. There are shock absorbers on the front and rear stations. Two top rollers are provided, to support the track and keep it well clear of the road wheels, and they also improve the water propulsion characteristics of the vehicle. Correct track adjustment is maintained through an hydraulically operated tensioner. The tracks are of manganese steel (width 343 mm. (13.5"), pitch 116.6 mm. (4.59"), rubber padded and rubber bushed and driven by sprockets attached to the final drive at the front of the vehicle. There are a total of 182 track links. Ground pressure is 11.11 lb. sq. in. (or 0.78 kg. cm<sup>2</sup>)).

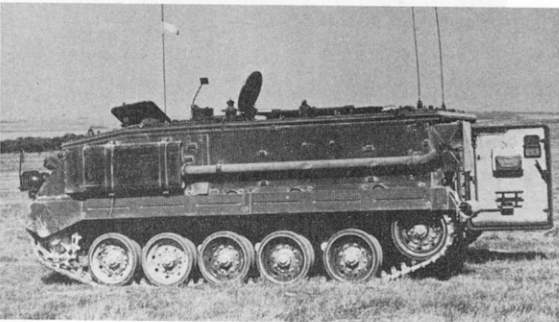
### VENTILATION

The FV432 was designed to operate under all conditions, ranging from the tropics to the arctic, and from a nuclear to a chemical attack. The ventilation unit is in the forward right hand side of the vehicle. Air is drawn in by means of a fan through a paper element filter mounted externally on the right hand side of the vehicle and pumped into a duct which runs around the inside of the vehicle at roof



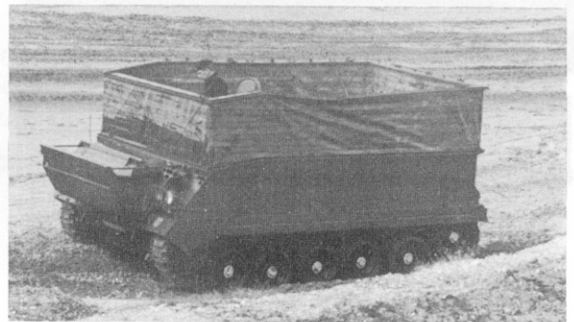
*Three-quarter right front view of an FV432 of the School of Infantry, 1971.*

(C. F. Foss)



*FV432 used by the Royal Artillery, showing exhaust pipe on left hand side of the vehicle and rear door open.*

(C. F. Foss)

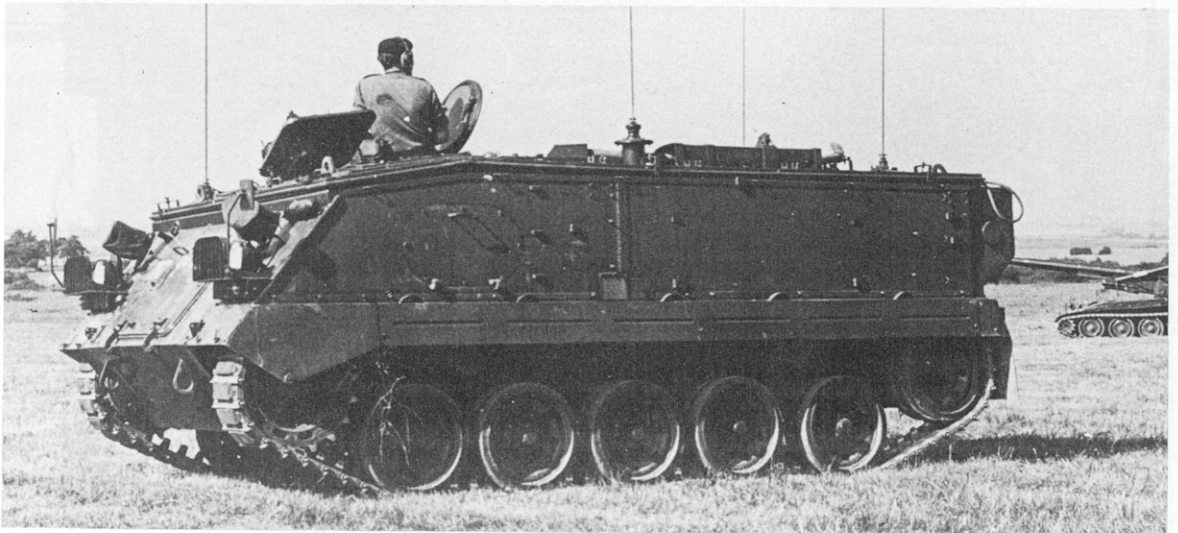


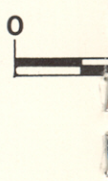
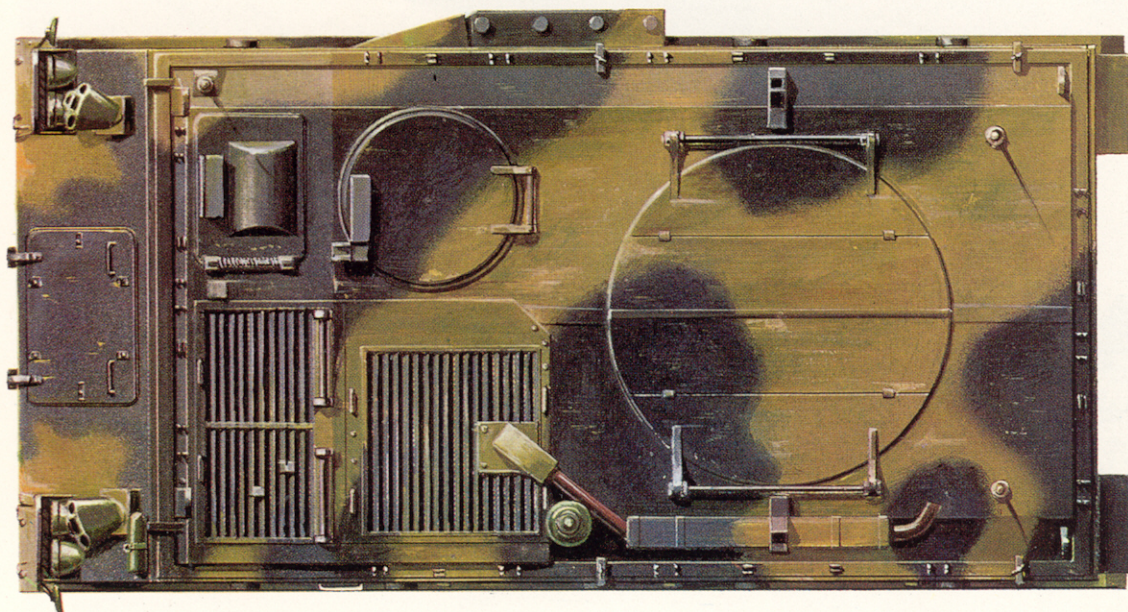
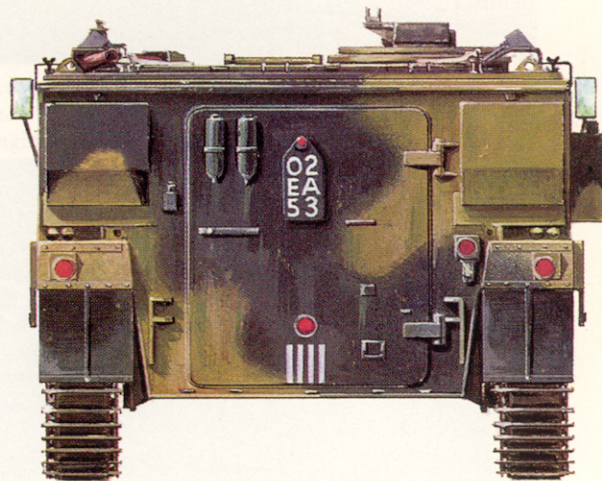
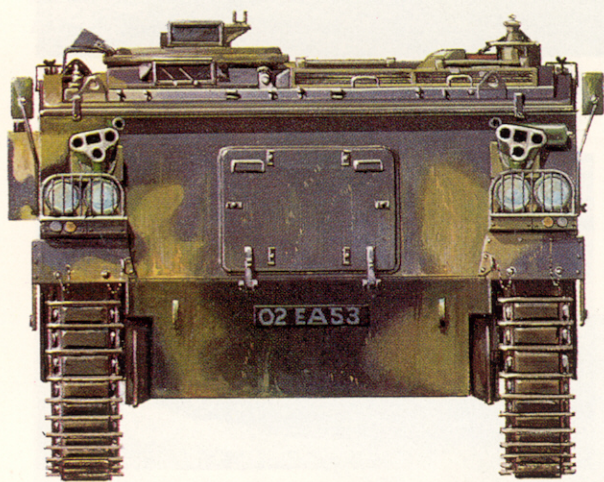
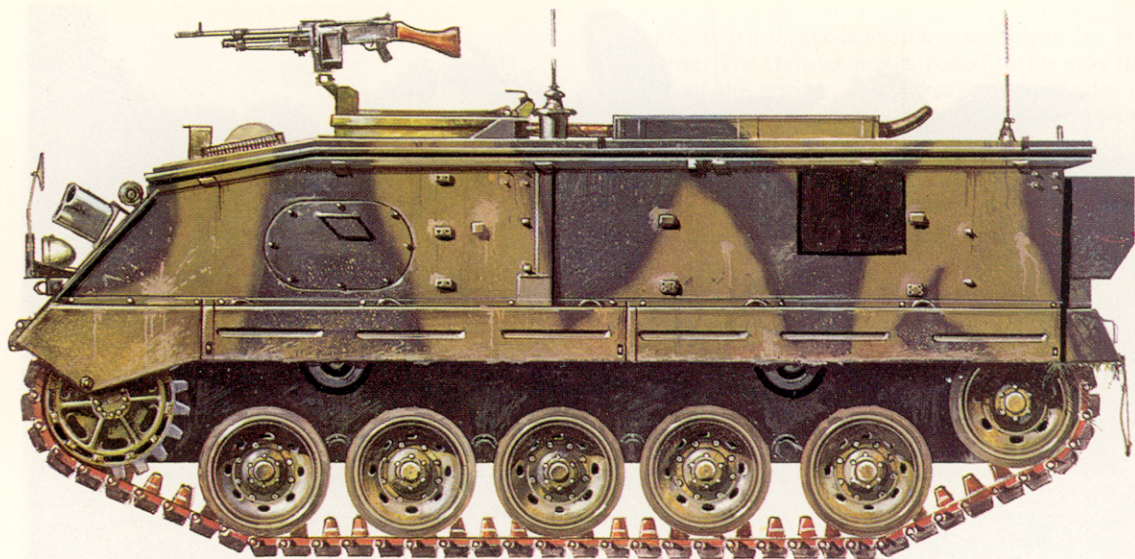
*FV432 with flotation screen raised and buoyancy trimmer erected on the front.*

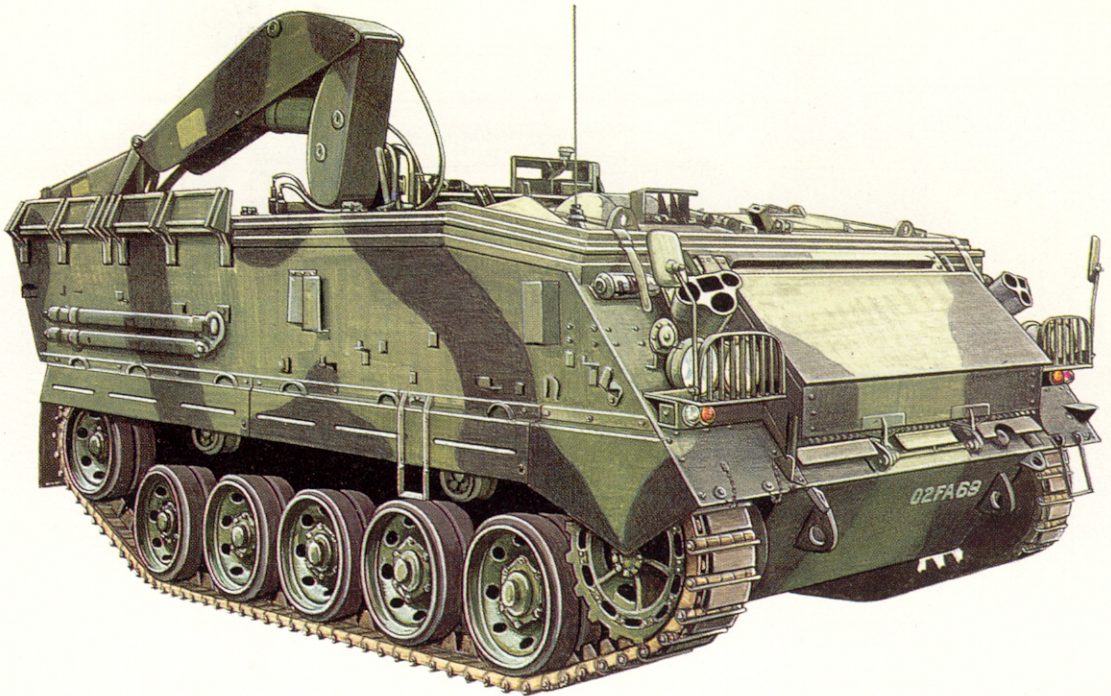
(C. F. Foss)

*FV432 used by the Royal School of Artillery. Note that the exhaust pipe is on the roof and not on the left hand side of the vehicle.*

(C. F. Foss)







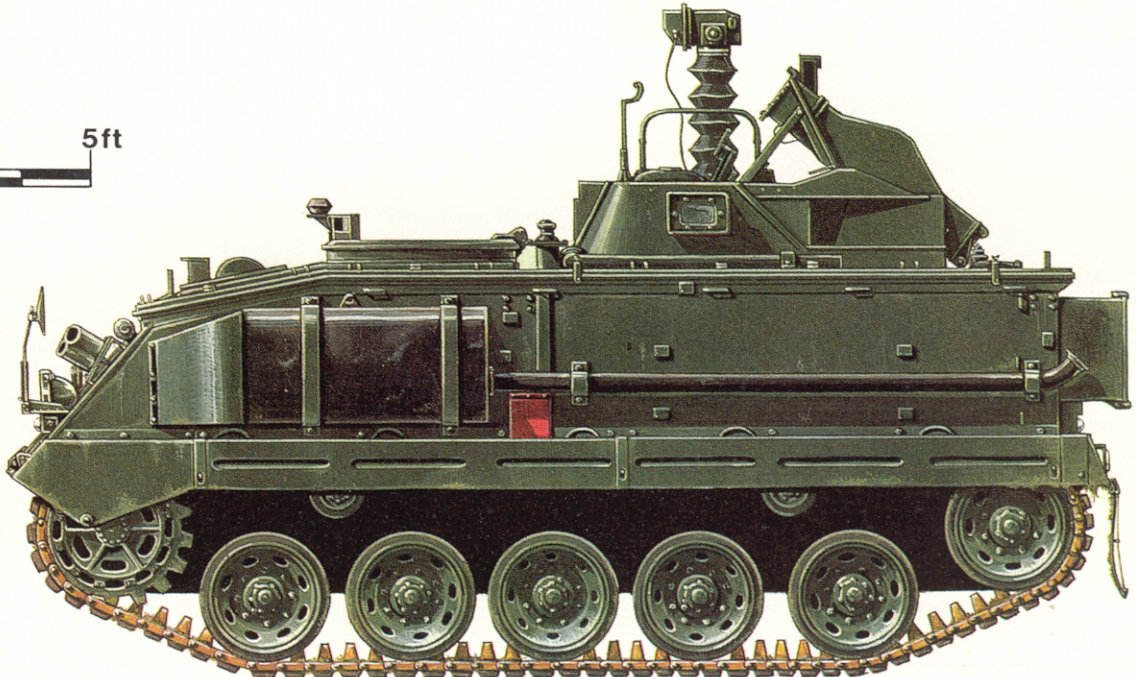
*Left: FV432 Armoured Personnel Carrier*

*Above: FV434 Maintenance Carrier*

*Below: FV438 Swingfire Launcher Vehicle*

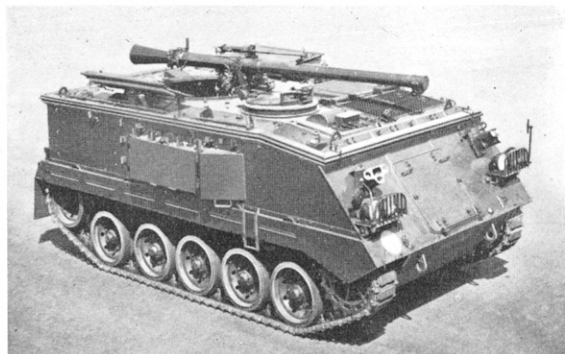
*T. Hadler/D. Warner/D. Palmer © Profile Publications Ltd.*

5ft





Men of the 1st Battalion Worcester and Sherwood Forester Regiment carrying out maintenance on an FV432 (Command) at the School of Infantry, Warminster, Wilts. (COI/CCR)



FV432 in the anti-tank rôle with a Wombat fitted. (CCR)

level and extends into the driver's compartment. Provision is also made for the fitting of charcoal filters which are used under conditions of gas attack. The fan is capable of pressurising the vehicle to 3 in. swg. to keep out radioactive dust. The system can be adopted to accept either a heater or a refrigerator unit for use in cold or hot conditions. To complete the circuit a relief valve is mounted in the roof, which maintains a constant internal pressure and prevents the ingress of foreign matter under conditions of external blast or external pressure change.

#### DRIVER'S CONTROLS

The driver is seated in the front right hand side of the vehicle and has basically only three controls—two steer-

ing levers, accelerator and gear selection lever. Once a range of gears has been selected to suit the driving conditions, the changing is completely automatic, being governed by the speed of the vehicle and the throttle opening.

To drive the vehicle the driver first selects the gear range required, then releases the brakes by pulling back the steering levers; the vehicle moves forward when the accelerator is depressed. To stop the vehicle the accelerator is released and the steering levers pulled right back.

#### ELECTRICAL EQUIPMENT

The vehicle operates on a 24 volt nominal DC system, with the negative pole earthed. Two AC generators, rectified to DC for battery charging and general purposes are provided. A total of 6 batteries are carried with a capacity of 100 Amp/hr. (2 series connected for automotive purposes, 2 series connected for ventilation purposes and 2 series connected for radio equipment).

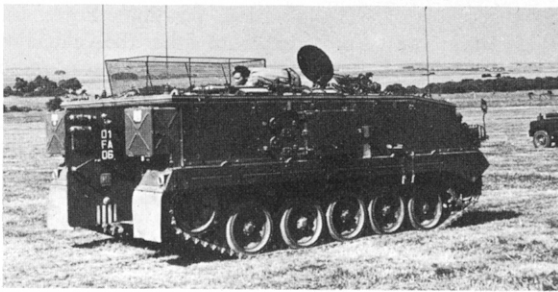
A power tool supply (208 V. 400 cycles/sec.) is supplied by inboard alternators through a power tool unit to an external outlet (optional extra for RE section vehicles). Penthouse lighting is provided for. All devices are suppressed to prevent interference with the radio equipment. Various types of radio can be fitted, depending on the rôle of the vehicle. A common 3 set harness is used for every different installation.

The FV432 has two headlamps mounted on the front of each side of the vehicle, below the smoke dischargers. One headlamp either side is fitted with an infra-red filter and both these headlamps are protected by a metal



*FV432 with FACE. Note wire rack over hatch and exhaust extension pipe fitted.*

(C. F. Foss)



*FV432 with FACE (Field Artillery Computer Equipment). Note late model filters let into the right hand side of the vehicle.*

(C. F. Foss)



*Three-quarter left rear view of FV432 with 81 mm mortar.*

(C. F. Foss)

*FV432 in its mortar rôle with 81 mm mortar firing through the roof of the vehicle.*





Interior view of FV432 with FACE showing part of installation. Note FV433 Abbot Self-Propelled Gun firing in background.  
(Marconi Space and Defence Systems Limited)

guard. Below these headlamps are a side light and an indicator. At the rear of the vehicle is a rear/stop light, indicator and reflector each side.

### FIRE FIGHTING EQUIPMENT

The engine fire fighting equipment includes a fire-wire detection system. This system uses BCF (gas) which is expelled through a network of perforated tubes. A total of five expendable hand operated extinguishers are provided, two inside the vehicle and three outside (two of which are fitted to the rear door, and the other on the front of the vehicle).

### TOW BAR

A hinged tow bar can be provided which straddles the door and carries a towing bar. When this tow bar is in position however, the rear door cannot be used, and the means of entry used is the roof hatch. The fitting of the bar enables the FV432 to tow a 1-ton 2-wheeled trailer.

### PERFORMANCE

The vehicle has a maximum road speed of 32.5 m.p.h. (52 km.p.h.), and a road range of 300 miles when using diesel fuel. The cross country range on diesel fuel is about 170 miles. It can cross a trench up to 6' 9" wide, climb a vertical obstacle 2 feet (-609 m.) high and climb a 35 degree gradient. It has a turning circle of 17' 6". The FV432 can ford to a depth of 3' 6" (1066 mm.) without preparation. The crew can, however, erect the flotation screen which is carried in a metal frame surrounding the roof of the vehicle. The screen, when erected, is 30" high

and is held in an erect position by stays. The buoyancy trimmer on the front of the vehicle is simply pulled out and locked into position. An extension piece is also fitted to the exhaust pipe so that it is above the water level whilst afloat.

The screen takes anything up to five minutes to erect, depending on the training of the crew and whether it is day or night. When in the water the vehicle is propelled by its tracks at a speed of 3½ to 4 knots, steering being accomplished in a similar fashion to that on land.

### VARIANTS

The basic vehicle can be adopted for a variety of rôles including:

#### Command Post

For use in the command rôle, the inside of the vehicle has a map board frame on either side. These have three sliding panels with mapboards attached and there are tables facing either way with a centre seat. Fluorescent lighting is provided above the mapboards, four mapboards either side. A collapsible penthouse measuring 12 ft. long, 9 ft. wide and 76 in. high, can be bolted to the rear of the vehicle. This has four fluorescent lighting units similar to those in the vehicle itself and these units can be fitted to the penthouse in various positions. Power for these lamps can be provided from either the vehicle or from a separate battery. Various combinations of radio can be fitted for the command rôle.

In this command rôle the crew consists of commander, driver and five men (i.e. command staff and radio operators). Laden weight is approx. 34,000 lbs. (15.5 tonnes).

#### Ambulance Rôle

In this rôle all armament is removed and the vehicle carries four stretchers which are easily loaded and unloaded from outside the vehicle by means of sliding swivel racks. Provision has been made for a passage down the centre of the personnel compartment between each row of two stretchers. It can also be arranged to carry five walking wounded and two stretcher cases. Sufficient room is left in the vehicle for medical supplies.

#### Cargo Rôle

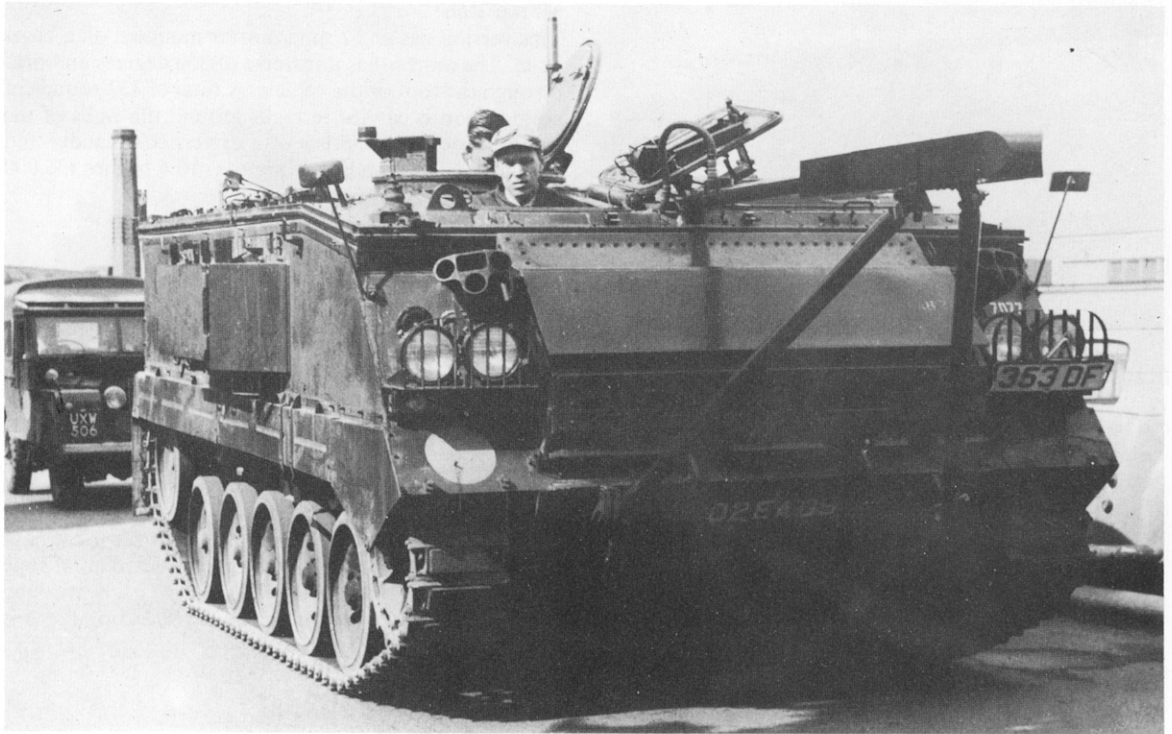
When the seats are folded away the vehicle can carry approximately 8000 lbs. of cargo. This can be loaded or unloaded through the top hatch or the rear door.

#### Anti-Tank Rôle

In this rôle a Wombat Recoilless anti-tank gun is carried. In early models the gun was carried inside the vehicle and, when it was required for combat, ramps were put at the rear door and the gun man-handled down the ramp where it was made ready for firing. In the newer version the gun is mounted in the vehicle with its barrel and mounting showing above the circular hatch. This mounting has a limited traverse of 30 degrees, elevation of +7.5 degrees and a depression of -3 degrees.

The gun can also be fired dismantled from the vehicle, ramps and a hand winch being installed for this purpose. 12 rounds of ammunition are carried (racks hold 3,3,4 and 2 rounds). Crew is three men plus driver and commander. Laden weight is 15.9 tonnes (35,000 lbs.).



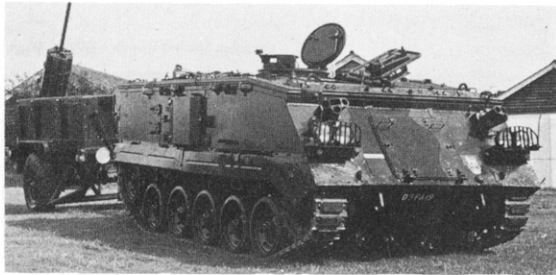


*FV432 fitted with Sperry Vehicle Navigator.*

(Sperry Rand Limited)

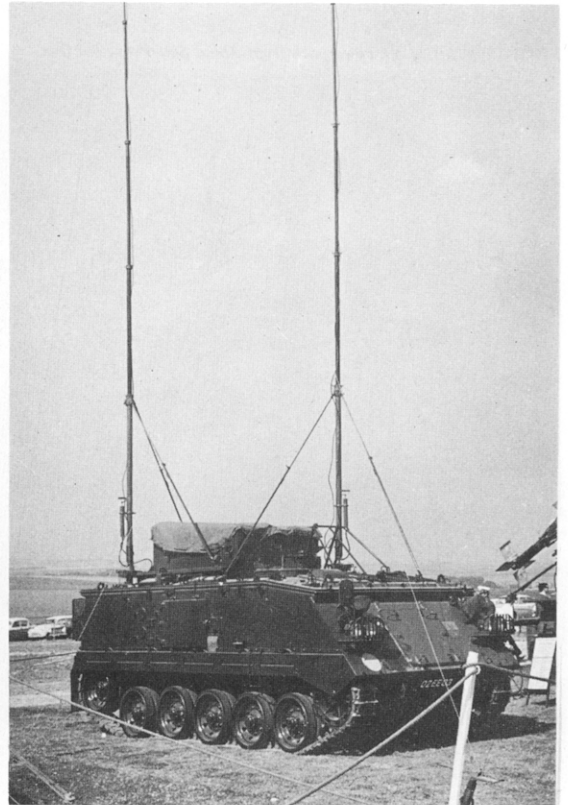
*FV432 of the Royal Engineers Wing, Royal Armoured Corps Centre, Bovington, Dorset, towing a trailer equipped with the Giant Viper mine-clearing equipment.*

(C. F. Foss)



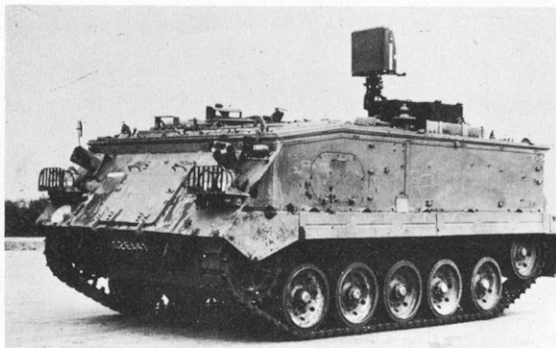
*FV432 with sonic detection equipment at the Royal School of Artillery, 1971.*

(C. F. Foss)



*FV432 with ZB298 Ground Surveillance Radar.*

(Elliott-Automation Radar System Limited)





Three-quarter left rear view of FV434 with Abbot 105 mm barrel across rear load compartment. (C. F. Foss)

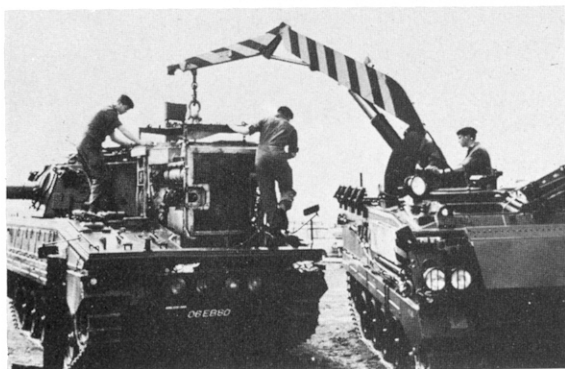
#### Mortar Rôle

This version has an 81 mm. mortar mounted on a baseplate. The mortar has a traverse of 360 degrees and fires through the roof of the vehicle. A total of 132 rounds of ammunition is carried in racks around the walls of the vehicle. The crew consists of a driver, commander and four men. Laden weight is approx. 16.4 tonnes (36,000 lbs.).

#### Recovery Rôle

In this rôle a winch, winch sub-frame and earth anchor are carried. The winch, a Plumett auto-capstan winch type CA45, is of the double capstan type and is mechanically driven from the power take off on the engine case. The winch has both a high and low speed gear and is fitted with a freewheel brake. It has a maximum line pull of 6.5 tons (6608 kg.), maximum pull using a 3 part tackle of 18 tons (18,299 kg.). Maximum line speeds 60 f.p.m. (18.34 m./m.) at 6608 kg., 400 f.p.m. (122.24 m./m.) at 3050 kg. (3 tons).

This version has a shorter rear door as the cable pays out through the bottom part of the door. 250 m. of rope (14 mm. in diameter) are carried and this has a breaking load of 11,200 kg. Weight of winch (excluding rope) is 470 kg. Maximum rope pull at hook—high gear 3000 kg.; low gear 6500 kg.



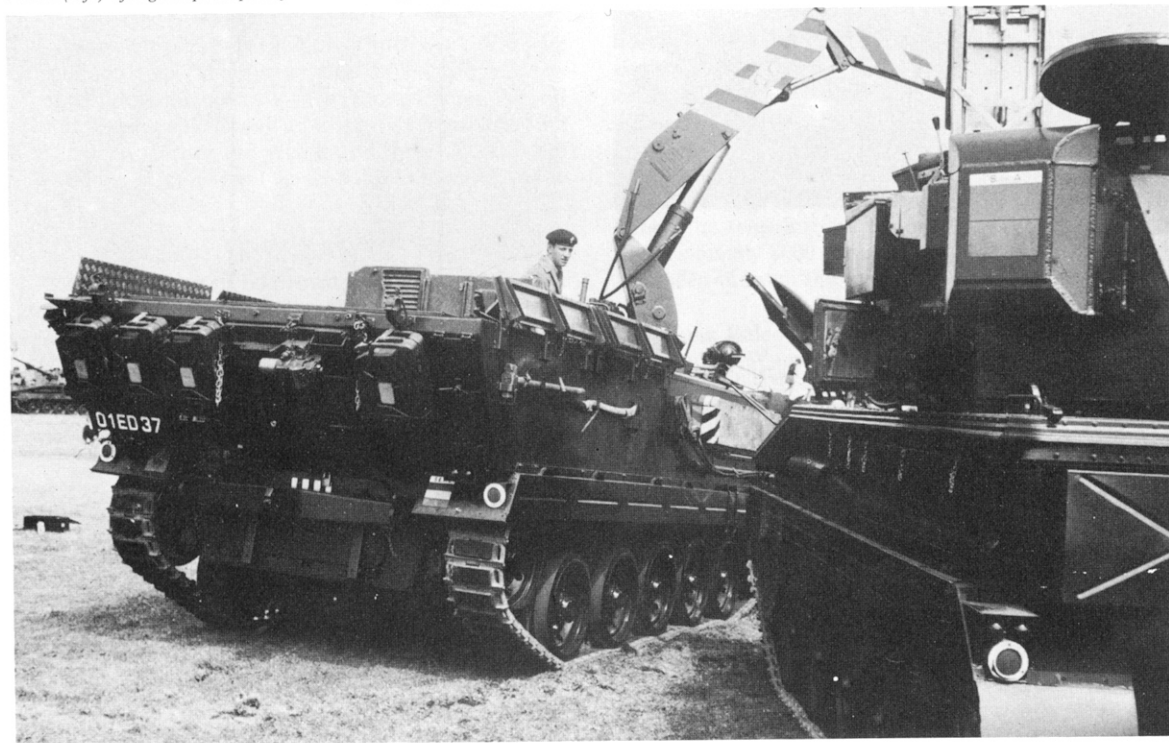
Front view of FV434 (right) lifting out powerpack from Abbot SPG, FV433. (C. F. Foss)

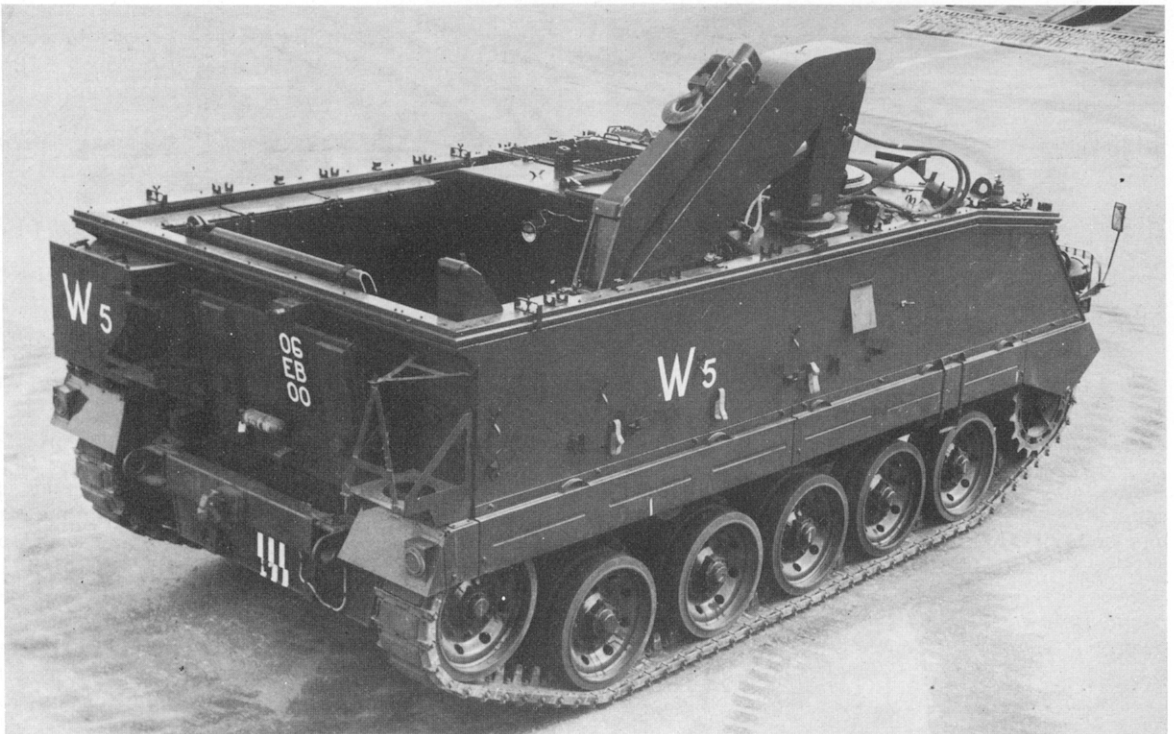
#### FACE Vehicle

The FV432 can be adopted to carry the Field Artillery Computer Equipment in the personnel compartment. This is used by the Royal Artillery to give fire control information to the guns and one of these vehicles is normally found in each battery of self-propelled artillery. This vehicle cannot be quickly converted to other rôles.

FV434 (left) lifting out powerpack from Abbot Self-Propelled Gun. (C. F. Foss)

(C. F. Foss)



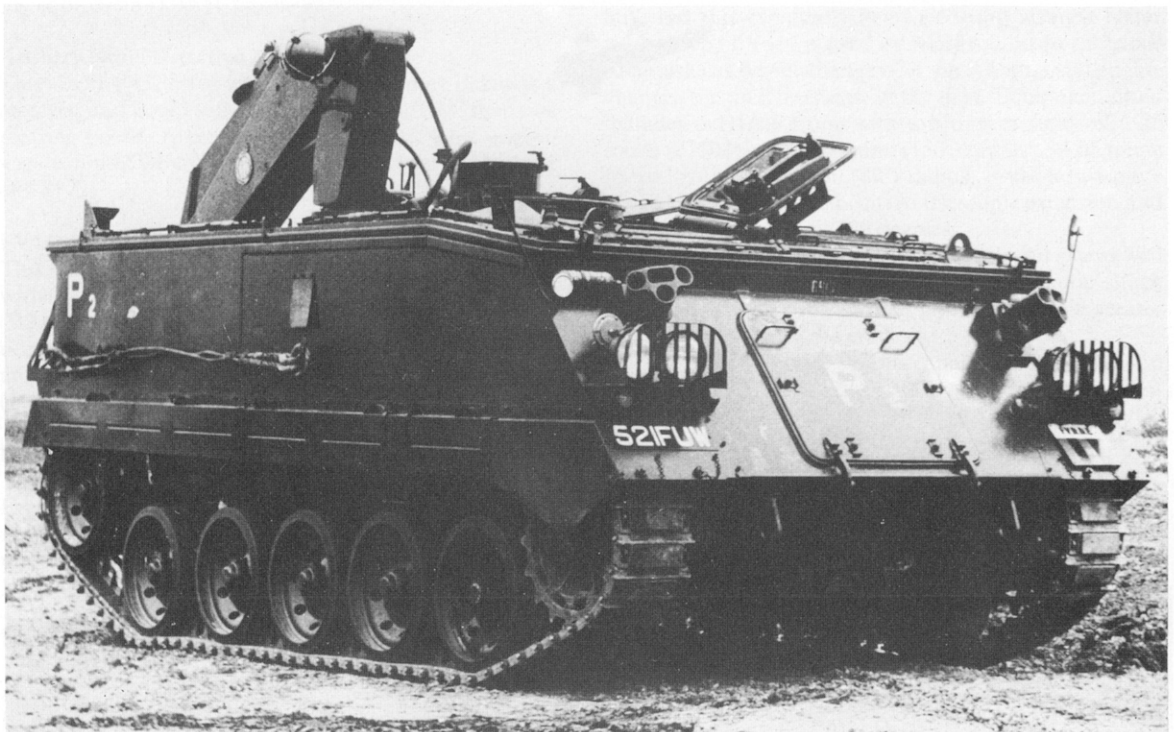


*Three-quarter right rear view of one of the FV434 development vehicles.*

(R.A.C. Tank Museum)

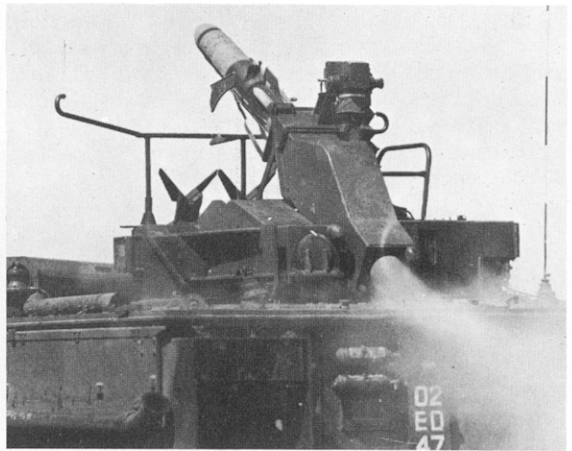
*Early FV434 development vehicle.*

(R.A.C. Tank Museum)

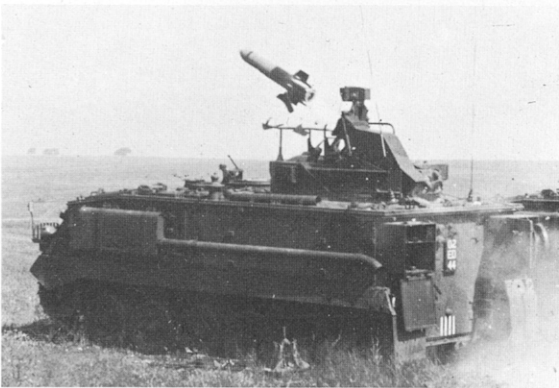




*Inside an FV438: commander (left) searches for target while Swingfire missile is loaded (right).*  
(British Aircraft Corporation (Guided Weapons Division))



*Close up of Swingfire missile being launched from the right-hand launcher on an FV438.*  
(British Aircraft Corporation (Guided Weapons Division))



*Three-quarter left rear view of FV438 firing Swingfire missile.*  
(British Aircraft Corporation (Guided Weapons Division))

*Swingfire missile being launched from FV438.*  
(British Aircraft Corporation (Guided Weapons Division))



### **Radar**

Trials have been carried out with the Elliott-Automation ZB298 ground surveillance radar fitted on the roof of the vehicle, towards the rear.

### **Carl Gustav**

On this version a bar is mounted across the fighting compartment on which is mounted the 84 mm. Swedish Carl Gustav anti-tank weapon.

### **Navigation**

Trials have been carried out by the Sperry Rand Company of Bracknell with their Sperry Vehicle Navigator fitted to a FV432. This equipment enables the commander to know exactly where he is at any given time.

### **Minelayer**

The FV432 can tow the bar mine-laying system. The actual mine-laying equipment consists of a mine-laying plough, on either side of which is a standard tyre and cage wheel. The bar mine is made of plastic and weighs 11 kg., of which 8.4 kg. is explosive. Mines are fed to the minelayer from the APC. The plough makes the hole, an adjustable spacing mechanism accepts the mines and places them in a trench. Two harrow discs then close the trench and a chain is dragged behind the harrow discs to disguise the minelaying operation. This equipment can lay 600-700 mines per hour. The Soviet Army uses a similar system with the BTR-152, although it has recently developed a tracked minelayer on the same chassis as the Ganef SAM carrier. The French have also developed a mine-laying system based on the AMX chassis.

### **Giant Viper**

In the display of armour at the Royal Armoured Corps Centre's open day at Bovington in August 1971, an FV432 of the RE Wing of the RAC Centre was shown towing the trailer mounting the Giant Viper Mine Clearing equipment (L3A1C).

### **Artillery Sonic Detection Equipment**

This is an FV432 fitted with a sound recording link with a recorder and 2 x 45 radios. Also fitted is a TAC map and plotting board. A crew of eight is carried. This version was exhibited at the Royal School of Artillery in 1971 and 1972.

### **FV432 with Rarden Turret**

This was on trial in 1970. It is basically an FV432 fitted with the turret and 30 mm. gun as fitted to the Fox CVR (Wheeled) vehicle. Present status is uncertain. It has been rumoured that this variant will be issued to the Army as an anti-APC vehicle, although the new Alvis Scimitar (FV107) with the same gun is undergoing trials.

### **FV432 with Ferret Turret**

This was a trials version and was an FV432 fitted with a Ferret turret armed with a .30 Browning machine-gun. It was reported that an FV432 was fitted with Saladin turret after the Australian Army had fitted one of their M-113s with a Saladin turret.

### **FV432 SCAT**

This was developed by the Infantry Trials and Development Unit, at the School of Infantry, Warminster. It is basically twin 7.62 mm. GPMGs mounted on the

commander's cupola. SCAT is reported to mean "Shouldn't Cost A Tenner"! It has also been reported that FV432s in the infantry battalions will be fitted with a small turret mounting a GPMG and two 3 barreled smoke dischargers. This turret will be over the rear circular hatch.

### **Amphibious Capability Improvement**

Various experiments were carried out to improve the FV432s swimming capability and also to improve its capability to leave the water. For example FV432s were fitted with an outboard motor on either side of the hull side to give increased water speed and improved manoeuvrability. Another FV432 was fitted with three rockets either side to assist it leaving the water, especially over the banks of rivers.

### **FV432 with Cymbelinè**

This is being developed to replace the FV436. It is an FV432 fitted with the EMI Cymbelinè on the roof of the vehicle. The Cymbelinè Radar is much lighter than the Green Archer and can be used for mortar location and the adjustment of artillery fire.

The above are the simple conversions. Below are the more complex variants, which cannot be adopted for other rôles.

### **Blue Water Project**

There was at one time a project to fit the Blue Water surface to surface missile to an FV430 series chassis, but the whole Blue Water programme was scrapped.

### **FV433 Abbot SPG**

This is the subject of a separate Profile. The Abbot uses the same suspension and engine components as the FV432; their engines, however, cannot be exchanged.

### **FV434 Carrier, Maintenance, Full Tracked**

Early experimental versions were simply an FV432 with a HIAB crane mounted on the top right hand side of the hull, but this eventually developed into a much better vehicle. The FV434 is used by REME units to carry out such tasks as barrel changes (i.e. on Abbots) and engine changes (i.e. in Chieftains) in the field. Equipment fitted includes a HIAB crane with a lifting capacity of 1.25 tonne (2750 lbs.) at 3960 mm. (156") radius to 3.05 tonne (6720 lbs.) at 2260 mm. (89") radius. It has a two-piece hinged jib with a three position telescopic extension and can be slewed through 190 degrees.

Other equipment includes tools, bench and vice as well as storage space for spare parts. Its hydraulic shock absorbers are lockable, which gives the vehicle greater stability when using the crane.

The FV434 has amphibious capability. Crew is 4 and consists of commander, driver and two fitters. Armament is a 7.62 mm. (Bren) LMG with 12 magazines and 6 smoke dischargers. Full data is given in the table at the end of this Profile.

### **FV436 Self-Propelled Mortar Locating Radar**

This version has its rear hull cut away and a Green Archer Mortar Locating Radar system mounted. This radar is designed to locate enemy mortar positions, and these positions are then passed to the artillery. It has full amphibious capability. Crew is 3: driver, commander and radar operator. Armament is a 7.62 mm. MG and smoke dischargers. The Radar is manufactured by EMI Limited.



FV436 with Green Archer Mortar Locating Radar.  
(EMI Electronics Limited)

## OTHER VERSIONS

### FV437 Pathfinder

This was an experimental version of the FV432 and was designed to assist other tracked vehicles leaving the water. To accomplish this the vehicle was equipped with a capstan winch, which led out through the front of the vehicle, and a rocket propelled earth anchor, and was fitted with hydro-jet propulsion system for use in the water. No flotation screen was required as this version had additional buoyancy equipment fitted.

### FV438 Swingfire Launcher Vehicle

This is an FV432 hull fitted with an armoured superstructure on the rear roof of the vehicle, on which is mounted launcher boxes for two British Aircraft Corporation Swingfire long-range anti-tank guided missiles. These are under armour protection and have an effective range of over 4000 m. An additional 14 missiles are stowed inside the vehicle; these are fed to the launcher from within the vehicle. A periscope is provided on the superstructure to aim the missiles, or, if required, the vehicle can be out of sight behind a hill and the missiles fired up to 50 m. away from the vehicle by remote control.

Also fitted is a 7.62 mm. GPMG on the commander's cupola and two, three barreled smoke dischargers which are in the same position as those on the basic FV432. Basic technical data is similar to the FV432, as is performance. Other data is:

Length: 16' 9"	Width: 9' 9"
Height: 8' 10½"	Ground Clearance: 16"
Weight: 32,000 lbs. Unladen	35,500 lbs. (laden)

FV438 is in service with the British Army and issued on a scale of six per armoured regiment.

### FV439 Communications

This is a special vehicle used by the Royal Signals. It has a box-like structure over the rear hull and telescopic aerials (one hydraulically erected aerial mast).

## EMPLOYMENT

The FV432 is used by most arms of the British Army in one rôle or another. For example the REME use the FV434, the RAC the FV438, and the infantry the basic FV432. For example, in 1966 the 1st Battalion of the Royal Sussex Regiment in BAOR had a total of 82 FV432s.

The FV432 will remain in British Army service for some years to come as no replacement has been announced. The Alvis Spartan (FV103) APC will come into service in the future but this will be used in a more specialized rôle as it can carry only seven men: commander, driver and five passengers.

It is probable, however, that the FV432 will have to be replaced by a more advanced and more expensive armoured personnel carrier in which a turret-mounted weapon will be provided and the crew will have some provision for fighting from within. But the capability to fight from within the vehicle (for example, the Russian BMP-76PB, BTR-60PK, BTR-152K vehicles have this capability, as has the new German Marder), is a very debatable subject. In fact at the British Military Vehicles Exhibition in 1971 GKN Sankey put forward a project called APC70 which included an APC with a Rarden turret and firing ports.

The FV432 is more expensive than the comparable American M-113 vehicle. This is due to the low production run of the FV432 when compared to that of the M-113, of which over 40,000 have been built.

SPECIFICATION	FV421	FV432	FV434
Length overall	17' 6½"	17' 3"	19' 3½"
Length hull only	—	15' 10"	—
Width overall	9' 0"	9' 2"	9' 4"
Width over tracks	8' 1½"	8' 3½"	8' 3½"
Length of track on ground	9' 0"	9' 3"	9' 3"
Track centres	7' 0"	7' 2"	7' 2"
Height to Roof	7' 10½"	6' 2"	6' 2½"
Height over MG	—	7' 6"	—
Height over crane	—	—	9' 2"
G/Clearance (Front) loaded	1' 4"	1' 4"	1' 4½"
(Rear)	—	—	1' 1½"
Road speed m.p.h.	32	32.5	29.5
Road range miles	250	300	270
Vertical obstacle	2'	2'	2'
Gradient	35°	35°	30°
Fording	—	3' 6"	3' 6"
Laden weight lbs.	29,680	33,300	33,166
Unladen weight lbs.	18,480	30,000	30,352
Airportable	—	22,000	—
Power/weight ratio	12.07	16.05	—
Fuel gallons	100	100	100
Crew	2	2 + 10	4
Engine	Petrol	Fuel oil	Fuel oil
Type	B-80	K-60	K-60
Mark number	No. 1 Mk. 5F	Mk. 4F	Mk. 4F
b.h.p./r.p.m.	160/3750	240/3750	240/3750
Transmission	Rolls-Royce	TX-200-4A	TX-200-4A
Track width	13½"	13½"	13½"
Ground pressure	10.2 p.s.i.	11.11 p.s.i.	11.12 p.s.i.
Road wheel diameter	24"	24"	24"
Trench crossing	6' 9"	6' 9"	6' 9"
Track: No. of shoes	105	182	182
Pitch	3.93"	4.49"	4.49"

## AFV/Weapons Series Editor DUNCAN CROW

### ACKNOWLEDGEMENTS

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# AFV/Weapons Profiles

Edited by **DUNCAN CROW**

## FORTHCOMING TITLES:

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(publication delayed).

**54 Japanese Combat Cars, Light Tanks and Tankettes**  
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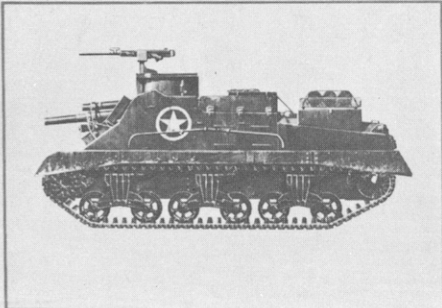
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