TRACKED ENGINEER VEHICLES

Steyr Daimler-Puch 4KH7FA-AVE Pionier Engineer Tank

Notes: This is a combat engineer vehicle based on the chassis of the 4K 7FA-KSPz armored personnel carrier. In this role, the APC has a raised superstructure in the front two-thirds of the vehicle, upon which is mounted a large digging bucket on the end of an extensible arm. This bucket may be removed and replaced with an earth drill with a 350mm wide bit, or a crane head. The digging bucket may dig into up to 2.2 meters of earth at a time; the crane head has a capacity of 8 tons. The vehicle has a dozer blade on the front, and there is also a winch with a capacity of 8 tons and 60 meters of cable. Four smoke grenade launchers are mounted near the rear of the superstructure, firing over the back of the vehicle. The Engineer Tank typically carries construction tools, excavation tools, a chainsaw, welding equipment, and an air compressor. At the front of the hull, above the fenders, are 4-round clusters of smoke grenade launchers. This vehicle is in service only with Austria and Tunisia (Tunisia has only 2).

This vehicle has all-welded steel armor which is relatively thin to keep weight down. The fire suppression system is unusual in that that it can be set to operate automatically, but can also be operated manually. Power is provided by a Steyr 7FA turbocharged diesel with 320 horsepower, coupled to an automatic transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$318,286	D, A	1 ton	19 tons	4	24	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
132/93	33/23	500	113	Stnd	T3	HF9 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1050x.50

Steyr Daimler-Puch 4KH7FA-SB 20 Greif

Notes: This is a recovery vehicle based on the 4K 7FA-KSPz armored personnel carrier chassis. The vehicle has a large raised superstructure over the front half of the cassis, while the back of the hull has a stand for an engine and transmission assembly for a light armored vehicle, or other spare parts. On the right front of the superstructure is a crane with a capacity of 6 tons with 42 meters of cable. The main winch leads out through the front of the hull and has a capacity of 20 tons, with 95 meters of cable. The Greif has a dozer blade at the front of the hull, normally used to brace the vehicle during winching and lifting operations. The Grief normally carries a wide selection of tools, including a welding set, an air compressor, and wheeled vehicle, tracked vehicle, excavating, small arms, and heavy ordinance tools. Power is provided by a 320-horsepower turbocharged diesel engine, the same as that on the AVE above. The transmission is automatic, and also the same as on the AVE. At the front of the hull, above the fenders, are 4-round clusters of smoke grenade launchers. The Greif is in service with Argentina, Austria, Bolivia, Morocco, Botswana, Brazil, and Nigeria.

Note that the AVE above is based on the same chassis, and much of the vehicle is similar to the Greif.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$289,887	D, A	3 tons	19.8 tons	4	24	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
129/90	32/23	400	113	Stnd	T3	HF9 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1500x.50

M-113A2 Recovery Vehicle

Notes: This armored recovery vehicle is based on the M-113A2 APC chassis. It is used by Brazil, Australia, Bahrain, Belgium, Egypt, Israel, Lebanon, Netherlands, and Sudan. The M-113A2 RV has a main winch with a capacity of 9.07 tons, and has 91.4 meters of cable. The winch's mechanism always makes sure the cable is wound around its drum as tightly and evenly as possible. Spades are lowered on each side of the hull during heavy winching operations and when using the crane. The crane is mounted on the left side of the roof, has a reach of 3 meters, and can lift 1.36 tons. The M-113A2 has been redesigned to provide extra buoyancy in areas necessary to counteract extra weight for its crane and winch mechanisms. Though some of these vehicles have been built in the US, none of them have been picked up for US Military service. (The remainder of these vehicles are built in Belgium.)

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$82,357	D, A	2 tons	11.64 tons	3	7	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
120/84	25/20/3	360	117	Stnd	T2	HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

Bernardini X-1A2 Recovery Vehicle

Notes: This is an X-1A2 light tank with the turret removed and replaced with a crane with a capacity of 8 tons. The vehicle also has a front mounted winch with a capacity of 10 tons, and a rear winch with a capacity of 20 tons, each with 60 meters of cable. The vehicle carries basic tools, tracked vehicle tools, wheeled vehicle tools, excavating tools, a tow bar, welding gear, an air compressor, and various ropes, chains, and pulleys for its tasks. An arc welder/cutter powered by the vehicle is also provided. Typically, two X-1A2-type roadwheels, two short tread sections, and a sprocket and idler are carried, along with a small selection of spare parts for the X-1 series. The RV can also carry a complete X-1A2 engine and transmission on its rear deck.

As with the X-1A2, the recovery vehicle version is powered by a 300-horsepower Saab-Scania turbocharged diesel engine, coupled to a manual transmission. The suspension is comprised of three bogies (and an idler and drive sprocket); as it uses an X-1A2 hull, it is lengthened as well.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$58,927	D, A	2.2 tons	19 tons	4	16	WL Spotlight	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
74/29	19/7	320	106	Stnd	T3	HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	600x.50

XLP-10

Notes: This is a Brazilian armored vehicle launched bridge based on the chassis of the X-1A light tank. The bridge on the vehicle can span a gap of 10 meters and take a weight of 22 tons. The bridge itself weighs 4.7 tons, and takes 5 minutes to emplace or recover. The chassis has its turret removed, and replaced with machinery to carry and emplace the bridge. The commander is rather low in the vehicle, as is the driver, and the bridge operator is in the center front of the vehicle and sits the lowest within the vehicle, generally working through vision blocks.

The setup is otherwise similar to the hull of the X-1A, with the driver on the left front and the commander on the right front. The commander has a mount for a light weapon; the weapon has limited elevation and left traverse while the bridge is being carried; and the commander can only raise his head to about the head-and-shoulders level. The engine is the same 280-horsepower Saab-Scania turbocharged diesel as on the X-1A, with a manual transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$46,188	D, A	250 kg	14.7 tons	3	13	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor*
81/33	20/8	750	50	CiH	T3	TF4 TS4 TR4 HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG (C)	1000x7.62mm

*The “turret” values are actually for the bridge, the “CiH” rating actually reflects the difficulty to hit the bridge and it’s machinery and do significant damage to it.

AEC FV-4003 Centurion AVRE

Notes: This is a CEV similar in concept to the US M-728, and also a variant of a main battle tank, in this case, the Churchill Mk VII. (In fact, the M-728 uses a modified version of the AVRE's gun.) It started trials in 1962 and entered service with the British Army in 1963. The last use of the AVRE was in Desert Storm, where it was put to use destroying obstacles and tank traps. The AVRE is heavily modified for its role as an AEV, particularly in the main gun and large forward dozer blade. The Chieftain AVRE was supposed to be replaced by the Vickers Trojan AVRE, but delays in the Trojan program as well as the spot-on demobbing of the AVRE has left the UK without any such vehicles.

The AVRE was modified first by replacing the turret with one designed to take the 165mm AVRE L-9A1 gun, firing a 29-kilogram HESH round. (Though effective range is short, and fire control sparse, the 165mm HESH can cause considerable damage to even the frontal aspect of a main battle tank.) This gun has a very abbreviated barrel with a fume extractor that takes up most of the gun barrel and a modicum of a flash suppressor. The gun is essentially used to fire a sort of tank shell version of a demolitions charge. The turret has large stowage boxes on either side, normally containing the large amount of block and tackle, ropes, wire ropes, and even hand-emplaced explosive charges. The gun has an L-8A2 coaxial machinegun, and an L-7A2 as a commander's machinegun. Each side of the turret has a bank of four smoke grenade launchers, at the point where the mantlet meets the gun. Another grenade installation is on the front turret, facing to the front sides of the vehicle, with a cluster of five on either side. An optional weapon, carried on the rear deck when used, is a Flexible Linear Demolition Charge, or line-charge thrower. Another possible weapon is a trailer carrying the Giant Python or Barmine or Giant Viper mine throwing system. One sighting device peculiar to such vehicles was the Type 2100 double-prism periscope, designed to produce a highly-magnified view at short range, to produced an enhanced sight figure of obstacles.

Behind the turret is a pair of hatches in the roof of the vehicle; normally a "penthouse," a structure to expand enclosed work area, is raised above the hatches. This generally covers the rear deck and is made of steel or aluminum plates, or Kevlar or Fiberglas boards. These are used for anything from the preparation of specialist equipment to troop living space when off-duty, and it simply folds away when not needed.

The driver is at the front center of the vehicle, behind the glacis, under a hatch that gives the driver a wide-angle vision block and a night vision block. The commander and gunner also have a night vision channel, though their night vision is short-ranged, as long distance night vision was not deemed necessary. Likewise, the magnification of the gunsight for the main gun is also limited. Space in the turret is limited, but does include the requisite British hot-water heater for tea and rations. A vehicle collective NBC system is provided.

A large framework, called a "hamper" can be mounted above the AVRE, including the turret. This is used to carry more equipment if necessary. On the rear hull plate is a capstan winch, with 60 meters of rope and with a 10-ton capacity. The AVRE also has a crane, able to lift 13.6 tons. The frontal dozer blade has a secondary use of pushing mines aside, and as such has an AV of 8. Alternately, a Pearson Combat Dozer may be mounted, with an AV of 12. It can excavate 229 cubic meters per hour. In front is another winch, with a capacity of 50 meters (of cable) and 20 tons. Above the dozer blade on the glacis is a rack that is used to carry and deploy fascine mats; another one can be carried on the rear, or on a hamper.

Power for the Centurion AVRE is by a 650 hp Rolls-Royce Meteor diesel, along with a manual suspension. Like the Centurion tank, the Centurion AVRE is known to have a particularly balky transmission.

Prior to Desert Storm, AVRE's were given a small amount of spaced appliqué armor. While this increased the weight of an already-heavy vehicle, this was deemed acceptable for a vehicle that would be starting at the front or in follow-up forces, or brought up as a specialist asset and surrounded by dedicated fighting vehicles and infantry. Nonetheless, the AVRE with appliqué can barely move by today's terms.

Twilight/Merc 2000 Notes: These vehicles were never taken out of service – they were deemed too valuable in MOUT situations.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Centurion AVRE	$962,841	D, A	700 kg	51.81 tons	4	23	Passive IR (D, G)	Shielded
Centurion AVRE w/Appliqué		D, A	572 kg	54.3 tons	4	23	Passive IR (D, G)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Centurion AVRE	132/54	33/14	1037	235	Trtd	T6	TF40 TS17 TR11 HF60 HS13 HR8
Centurion AVRE w/Appliqué	118/48	30/12	1037	246	Trtd	T6	TF45Sp TS17Sp TR16 HF70Sp HS13Sp HR13*

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Centurion AVRE	+1	Basic	165mm Demolition Gun,	30x165mm,

	L-8A2, L-7A2 (C)	3000x7.62mm

*Floor AV is 6Sp.

BAE Terrier Armored Digger

Notes: The Terrier was designed to replace the FV-180 CET in British service. There have as yet been no export sales, though the French are in the process of field testing Terriers for its Army. The first prototype was displayed in mid-2005, but there were considerable delays, both during the testing and manufacturing process; manufacture of the first Terrier hull did not occur until early 2010, and Army and Marine service did not begin until 2013.

The Terrier has a more powerful engine than the FV-180, as well as a drive train with exceptional torque. The engine used is a C18 Caterpillar 700 horsepower diesel, with an automatic transmission. Most of the critical systems, lines, oil reservoirs, and power pack areas are under the Terrier's belly armor. Armor is all-welded steel; appliqué is bolted on, except for the belly armor, which is a new installation. The fuel tank is made from synthetic material stronger than steel, and is self-sealing. Terrier borrows a feature from the FV-180: it's double-walled construction, which also insulates from the noise of the tools and bucket and from mines.

The most prominent feature of the Terrier is its front clamshell bucket; this bucket has AV6 on the sides, AV4 on the top, and AV12 on the bottom and back, and allows the Terrier to be used as an *ad hoc* demining vehicle. The bucket can be quick-detached and dropped, in the event of the bucket getting stuck or if it inadvertently picks up dangerous material that must be abandoned. It can lift 400 cubic meters of soil or 8 tons. Another prominent feature is the right-side-mounted digger/tool arm, which can operate with a bucket, claw-hook, drill, or pneumatic hammer. It is able to reach out 20 meters and lift 3 tons. If the bucket is not in use, a roll of fascine or trackway can be put between the partially-raised bucket and the vehicle, allowing the Terrier to carry and deploy a section. However, the Terrier is more likely to use a GKN HMT, carrying a roll of fascine, trackway, or concertina wire. It can also tow a trailer with the Minotaur, Barmine, or Volcano minelaying systems. A rocket anchor may be deployed to help anchor the vehicle when using the tools or bucket, in any direction from the Terrier.

An unusual feature of the Terrier is that it can be teleoperated, using a radio-connected remote control similar to a video game control, at a range of up 1000 meters. This mode is used when clearing dangerous areas. The cameras that the Terrier uses for teleoperation are in front of the driver's hatch, above the bucket, and next to the side excavator. They are designed primarily for the control of the apparatuses, but the driver's camera can also look up to 300 meters in the distance. The cameras are day/night.

The crew of two has air conditioning, heating, and NBC Overpressure protection. Both crewmembers have all-around vision blocks, with the front having a day/night channel. The commander has a manually-rotating cupola with a weapon mounted so that it can be aimed and fired with the hatches closed; alternatively, an RWS may be mounted. A bank of four smoke grenade launchers are found on each side of the vehicle at the top of the hull side. They have five day/night cameras for their use, giving them a 360-degree view around the vehicle.

Based on experience in Iraq and Afghanistan, the design of the Terrier has been modified. Bucket AV has been increased by 1 for each face. The Terrier has been given additional underside protection as well, and has also been given blast-absorbing seats. Finally, all-around appliqué armor has been added.

While the British MoD claimed that the Terrier is air-transportable by a C-130, this has not proven to be the case. They are now backing off that claim.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Terrier	$1,424,741	D, A	800 kg	30 tons	2	23	Thermal Imaging (D, G), WL/IR Spotlight	Shielded
Terrier (Modified)	$1,529,983	D, A	613 kg	33 tons	2	23	Thermal Imaging (D, G), WL/IR Spotlight	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Terrier	171/119	43/30	521	254	Trtd	T6	HF12Sp HS8Sp HR7*
Terrier (Modified)	156/108	39/27	521	279	Trtd	T6	HF15Sp HS11Sp HR9**

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Terrier	+1	Basic	L-7A2 (C)	3000x7.62mm

*Floor armor is AV 4Sp.

**Roof Armor is 6. Belly Armor is 8Sp.

BAE Titan AVLB

Notes: This AVLB is a new AVLB system, able to use several types of bridges. The Titan was designed to replace the Chieftain AVLB; the Chieftain AVLB was proving deficient at the lengths of possible span, loads of possible spans, and survivability in general. It is one of a planned family of vehicles based on the Challenger 2 chassis. The Titan has been service since 2006, and

the final 33rd was delivered in 2008. The Titan has seen combat use in Afghanistan.

Depending upon bridges used and the bank conditions, the Titan can bridge a span of up to 60 meters. Three possible bridges can be carried: the No 10 Bridge can span 26 meters and weighs 13.88 tons, the No 11 can span 16 meters and weighs 8.54 tons, and the No 12 Bridge can span 13 meters and weighs 6.94 tons. The Titan also carries a number of trestles and wedges to allow the Titans' crews to overlay up to three of these bridges. The Titan can also carry and lay two No 12 Bridges. Each of these bridges is capable of supporting 70 tons. The No 10 and 11 are not scissor bridges (the No 12 is a single span), the top slides out and locks onto the front of the bottom bridge. (Unfolding a scissors bridge is like waving a big flag…)

The Titan has a number of wide-angle vision blocks and CCD cameras to increase the visibility of the crew while they work, especially if it works under fire. These cameras are day/night, with most of the night vision being by thermal imaging. The crew has an air conditioner, heater, and NBC Overpressure. The driver is in the front right while the other two crewmembers are in the center. Both are ringed by wide-angle vision blocks, and all three have one block with a night channel; they also have several LCD screens that show them the relevant images from the CCD cameras. The commander has a low-pintle mount for a machinegun.

Power for the Titan is the same as the rest of the Challenger 2 family: a 1200-horsepower Perkins CV12 turbocharged diesel, a David Brown low-loss gearbox (sort of like power assist for the steering and gearshifting), and an automatic transmission. The Trojan also has a 10kW APU to power systems while the engine is off, thus using less fuel.

The Trojan can tow the GKN HTT, with a variety of minelaying systems, MCLICs, fascines or trackway, or simple cargo.

An optional feature is a dozer blade at the front, to make the terrain on the bank more suitable or to brace the Titan while it is working. (Theoretically, it could also mount a Pearson mine plow, though this would be an unusual circumstance.)

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Titan (No 10 Bridge)	$970,095	D, A	400 kg	62.5 tons	3	29	Thermal Imaging (D, G, RWS), Image Intensification (RWS), WL/IR Spotlight	Shielded
Titan (No 11 Bridge)	$887,211	D, A	734 kg	57.16 tons	3	29	Thermal Imaging (D, G, RWS), Image Intensification (RWS), WL/IR Spotlight	Shielded
Titan (No 12 Bridge)	$862,377	D, A	834 kg	55.56 tons	3	27	Thermal Imaging (D, G, RWS), Image Intensification (RWS), WL/IR Spotlight	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor*
Titan (No 10 Bridge)	127/89	29/21	1592+600	616	CiH	T6	TF10 TS10 TR10 HF140Cp HS24Sp HR16
Titan (No 11 Bridge)	139/97	35/24	1592+600	565	CiH	T6	TF10 TS10 TR10 HF140Cp HS24Sp HR16
Titan (No 12 Bridge)	143/100	36/25	1592+600	549	CiH	T6	TF10 TS10 TR10 HF140Cp HS24Sp HR16

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Titan	None	None	L-7A2	2000x7.62mm

*The "turret" is actually the bridge; it does not actually have anyone in it.

BAE Trojan AVRE

Notes: Designed to replace or supplement several vehicles, including the Centurion AVRE, Chieftain AVRE, and to some extent, the CR ARRV, the Trojan is an AVRE that can, to a certain extent, double as an ARV. The Trojan is based on a Challenger 2 chassis, and retains the Chobham and spaced armor of that tank, though overall, the armor levels are lower to reduce weight. They have not yet been offered for export, but a small number are stationed in Canada at the British Army Training Unit Suffield.

Britain has 33 Trojans in service, and expects to have 66 by 2018. They saw their first combat use in Afghanistan in 2009.

The most prominent feature of the Trojan is its huge over-width mine plow. A Pearson Full-Width Mine Plow, it is generally able to push mines out of the way, being angles to slide the mines to the side without detonating them. It can, however, take some mine explosions and has an AV of 30Sp. (It not actually *Spaced* armor; this is an illustration of the plow's strength.) The mine plow can instead be replaced with a standard bulldozer; this has an AV of 6. Another alternate installation is the mine plow at the front and bulldozer blade at the rear, though this makes towing a trailer impossible. This configuration is chosen when the excavator arm needs extra bracing, or when large positions need to be dug. The Trojan has a huge excavator arm attached on the front left, which can dig, clear obstacles, or deposit the fascine or trackway that the Trojan can carry at its rear. This bucket has a capacity of one cubic meter.6.5 tons. Alternate attachments include a three-way claw, a drill, an auger, and a hammer/pile driver. The Trojan can automatically mark the mines or mine-free lanes it has found with small flags (the Pearson Pathfinder system).

The armor suite of the Trojan is based on the armor of the Challenger 2, but it is believed that the individual layers in the armor are not as thick. The Trojan can also take lugs for ERA on the hull front and hull sides. It should be noted that though armor levels are not as great as the Challenger 2, but the suspension is actually much better protected, even though the roadwheels are aluminum (the drive sprocket, idler, and return rollers are steel). The engine is similar to that of the Challenger 2, being a 1200-horsepower Perkins CV12 turbocharged diesel, a David Brown low-loss gearbox (sort of like power assist for the steering and gearshifting), and an automatic transmission. The Trojan also has a 10kW APU to power systems while the engine is off, thus using less fuel.

The Trojan can tow the GKN HTT, with a variety of minelaying systems, MCLICs, fascines or trackway, or simple cargo.

The crew consists of a driver on the front left, a commander's hatch, and the raised position for the operator of the excavator arm and plow, next to the driver. The driver has one day/night wide-angle vision block to the front. The commander does not have a cupola, but his position is ringed by vision blocks. The equipment operator has an electrically-operating cupola with all around vision blocks; one is day/night. The Trojan has an L-8A2 MAG machinegun mounted on an RWS to the left of the commander; this RWS has it's own vision devices for the commander or equipment operator to use (either may control the machinegun), Also on the roof is a spotlight, which may be controlled by the commander or the equipment operator. The crew has air conditioning, heating, and NBC Overpressure, and there is some room inside for rations, ammunition, personal weapons and ammunition, and a few assorted personal items. (The Trojan has, to an extent, been designed around the crew positions.)

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Trojan	$1,292,539	D, A	700 kg	62.5 tons	3	35	Thermal Imaging (D, G, RWS), Image Intensification (RWS), WL/IR Spotlight	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor*
Trojan	127/89	29/21	1592+600	616	CiH	T6	TF8 TF8 TR8 HF140Cp HS24Sp HR16

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Trojan	+2	Fair	L-8A2 (RWS)	3000x7.62mm

*The "turret" refers to the plow and excavator arm. The Mine Plow has an AV of 30Sp, the standard dozer has an AV of 6, and the excavator arm an AV of 10. Belly AV is 9Sp.

Vickers FV-4205 Chieftain AVLB

Notes: This is an AVLB in British service, based on the chassis of the Chieftain main battle tank. I have discovered that there were some export sales, but the only customer I have been able to find is Iran (before the revolution). The design work began in 1962, but the first examples did not see service until 1974. The Chieftain AVLB is currently used by only one regiment of the British Army. Chieftain AVLBs have seen action with the British in Desert Storm and Iraqi Freedom, and by the Iranians against the Iraqis.

The Chieftain can use one of two bridges: the No 8 Scissors Bridge, or the No 9 Single-Span Bridge. The No 8 Bridge weighs 12.2 tons, takes 5 minutes to emplace, and 10 minutes to recover. It is designed for up to 70-ton loads, and is capable of bridging a 22.86-meter gap. The No 9 Bridge is lighter at only 9.14 tons, and shorter at being able to bridge a 13.4-meter gap. It is still capable of holding 70 tons. Though the No 9 Bridge is not as capable in most ways, the Chieftain AVLB is much quicker carrying the No 9 Bridge. The Chieftain AVLB can also carry the No 8 or No 9 Bridge on top, and tow a trailer with a No 9 Bridge on it. The AVLB is able to grab the bridge from the trailer and lay it as an extension or adjunct to the previous bridge. Bridges may be combined by laying one bridge on top of the other at approximately the halfway point of the first span.

The driver, bridge operator, and commander are all in tandem, each seated somewhat above each other as you go back. The commander's cupola has a light machinegun which can be fired with hatches closed, and has full rotation, with all-around vision blocks. He does not have night vision. The bridge operator has vision blocks as needed – to the front and to see the bridge atop the vehicle. He has night vision. The driver has vision blocks to the left, front, and one that allows him to see somewhat to the right

side. He has night vision.. A cluster of four smoke grenade launchers are on the hull on each side just forward of the driver's position.

Power is provided by the Leyland L60 multifuel 730-hp engine, coupled to a manual transmission. The transmission has an unusual feature – it can jump from Park to 2nd gear if necessary for a quicker takeoff.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Chieftain AVLB (No 8 Bridge)	$237,738	D, G, A	400 kg	53.3 tons	3	25	Passive IR (D, BO)	Shielded
Chieftain AVLB (No 9 Bridge)	$230,844	D, G, A	450 kg	50.24 tons	3	25	Passive IR (D, BO)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor*
Chieftain AVLB (No 8 Bridge)	138/56	35/14	1037	263	CiH	T6	TF4 TS4 TR4 HF48 HS16 HR10
Chieftain AVLB (No 9 Bridge)	142/58	36/15	1037	255	CiH	T6	TF3 TS3 TR3 HF48 HS16 HR10

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Chieftain AVLB	None	None	L-7A2 (C)	4500x7.62mm

*The "turret" is actually the bridge; it does not actually have anyone in it.

Vickers CR ARRAV (Challenger Armored Repair and Recovery Vehicle) Rhino

Notes: This is an engineer vehicle based upon the Challenger chassis. The adoption of the Challenger 1 tank and it's dramatic increase in size and complexity meant that a new class of recovery and repair vehicles was needed to perform field engineer work on them. As yet, it is exported only to Oman. The vehicle is officially referred to as the CR ARRAV, but more popularly known as the Rhino.

The Rhino is capable of carrying an entire Challenger power pack as well as all necessary repair equipment. There is a winch that can pull 68 tons (104 tons with block and tackle), an auxiliary winch that can pull 20 tons, and a crane on the left hull (able to reach over the entire vehicle) with a capacity of 6.5 tons and capable of lifting an entire Challenger 1 or 2 powerpack. The Rhino also has a front-mounted dozer blade capable of excavating 229 cubic meters per hour and offers increased bracing and traction when lifting heavy loads. A special trailer (The HMT, of High-Mobility Trailer) is often towed, carrying a spare powerpack, to free up room for other spare parts. The Rhino is equipped with welding and cutting equipment, powered by the vehicle's engine. Tracked and wheeled vehicle tool sets are also carried.

The CR ARRAV generally carries a crew of three, including a specialist mechanic. An extra two seats are provided, to seat the extra two mechanics that are normally carried. There is also room for two more passengers. The Rhino is equipped with night vision devices and has an L-37A2 MG located in a remote cupola, operated by the commander or one of the mechanics; feeding is by a continuous-feed belt mechanism. At the rear of the vehicle at the corners are, on each side, a cluster of four smoke grenade launchers. Two more are found at the front of the Rhino. The Rhino has an NBC Overpressure system with a vehicular collective system backup. Omani Rhinos have in addition an air conditioner and an engine able to operate without penalty up to 50 degrees Celsius; these modifications have since been made to British Rhinos.

The CR ARRAV is powered by the same Rolls-Royce Condor CV12 TCA turbocharged diesel engine as on the Challenger 1, developing 1200 horsepower. The transmission is automatic, and the engine and transmission can be set to bypass the drive train to bring full power to the devices (winches, cranes, power tools, etc. Towing capacity is 68 tons, with a solid tow bar or by wire rope. (If the latter option is chosen, someone must be in the disabled vehicle to actuate the brakes on it.) While towing 68 tons, the Rhino can maintain a speed of 30 kilometers per hour.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$751,951	D, A	5.8 tons	62 tons	3+4	37	Thermal Imaging (C, CO), Image Intensification (D, C, CO)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
150/105	38/26	1592	440	Stnd	T6	HF149 HS21Sp HR16

Fire Control	Stabilization	Armament	Ammunition
+1	Basic	L-37A2	1000x7.62mm

Vickers Chieftain AVRE

Notes: There was to be a standardized Chieftain AVRE, with the designation of FV-4203, but that vehicle was never produced. Meanwhile, the need for AVREs did not dissipate, in Willich, Germany, the BAOR came up with their own Chieftain-based AVRE. This vehicle, at first being considered an interim design. was later put into production.

The primary role of the Chieftain AVRE is to enhance the mobility of combat forces. To this end, it has a large rack above the

vehicle able to carry three sections of 60-meter, steel pipe type, 14.5-ton MLC-70 fascine trackways. The Chieftain AVREs winch can pull 57 tons, the auxiliary winch can pull 17 tons, and the crane can lift 36 tons. The dozer blade can excavate 192 cubic meters per hour. It thus has racks for explosives and connections to pull multiple trailers that are usually carrying more fascines or the Giant Viper or Python mine-clearing systems.

The hull of the Chieftain has had its turret removed; the positions for the crew are equipped with several wide-angle vision blocks, and the commander's position has a weapon on a pintle. Observation is also available to the rack operator through a wide angle periscope mounted on the left-rear bumper. A similar periscope is found on the front-left bumper. The rear of the Chieftain AVRE normally has a "penthouse" fitted, a simple position covered with pads to even out the surface and with bows and a tarp; up to six more periscopes may be fitted around the penthouse if necessary. In the penthouse, a collective NBC pack can be fitted; the inside of the vehicle has NBC Overpressure protection. The driver is still on the left front, the commander is in the center, while the equipment operator is on the right. Behind and below them are the other two engineers. Only the driver has night vision.

Power is provided by the Leyland L60 multifuel 730-hp engine, coupled to a manual transmission. The transmission has an unusual feature – it can jump from Park to 2nd gear if necessary for a quicker takeoff. (I have not yet determined the game effect of this feature.)

The statistics below are with the Chieftain AVRE carrying two fascine rolls and with the penthouse deployed, the standard configuration.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$345,276	D, A	4.9 tons	52 tons	5	18	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor*
140/56	35/14	955	265	CiH	T6	TF8 TS8 TR8 HF84 HS18 HR10

Fire Control	Stabilization	Armament	Ammunition
None	None	L-7A2 (C)	1800x7.62mm

*The "turret" is actually the fascine rolls. If they have already been deployed, the configuration of the Chieftain AVRE changes to "Stnd."

Alvis FV-106 Samson ARV

Notes: The Samson is an armored recovery vehicle built on the Scorpion chassis. It is designed primarily to recover members of the CVR(T) family, but can also service the FV-430 series. Design work began in the early 1970s, with production starting in 1978. Users include Britain, Belgium, Brunei, Philippines, Oman, and Thailand.

The Samson is fitted with an internally mounted capstan 3.5-ton winch in place of the vehicle's turret and main gun. The vehicle is stabilized when working by an earth anchor that is manually deployed. Entry is by a small door in the rear of the vehicle, or by the commander's and driver's hatches on the roof. The Samson is used to repair and recover smaller armored vehicles and unarmored vehicles. Except as noted below, it is identical in characteristics to the Scorpion. The Samson has a main winch with a pull of 12 tons, a secondary winch with a pull of 3 tons, and an A-frame crane that can lift 5.5 tons.

The Samson is capable of amphibious operation by raising a flotation screen, and can be fitted with a propeller kit. Power is provided by a Jaguar J60 No 1 Mk 100B 190 horsepower gasoline engine, or a Perkins T6-3544 200-horsepower diesel engine, with a manual transmission. British Samsons, however, are powered by a Cummins 6BT diesel with 235 horsepower.

The driver is in the front left; behind him and in the center of the deck is a gunner manning a No 27 cupola with a pintle-mounted L-7A2. The commander and the other engineer are seated in the hull. The crew is protected by a collective NBC system.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Samson (Gas Engine)	$99,216	G, A	1 ton	8.74 tons	4	9	Passive IR (D)	Shielded
Samson (Diesel Engine)	$99,861	D, A	1 ton	8.76 tons	4	9	Passive IR (D)	Shielded
Samson (Perkins Engine)	$99,911	D, A	1 ton	8.77 tons	4	9	Passive IR (D)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Samson (Gas Engine)	174/70	44/18	405	97	Stnd	T3	HF6 HS3 HR3
Samson (Diesel Engine)	168/66	42/17	405	68	Stnd	T3	HF6 HS3 HR3
Samson (Perkins Engine)	188/76	47/19	405	81	Stnd	T3	HF6 HS3 HR3

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Samson	None	None	L-7A2 (C)	900x7.62mm

Alvis FV-180 CET

Notes: This vehicle first appeared in British service in 1976, over a decade after the initial requirement was published by the British Ministry of Defense. Because of this, the program was nearly killed several times, but by 2000, they were a fairly common sight in British service, and some were also used by India and Singapore. While most such vehicles are converted tanks or APCs or civilian vehicles, the CET was designed from the ground up to be a Combat Engineering Tractor.

The CET's main role are as an armored dozer, preparing fighting positions for heavy weapons and armored vehicles, repairing and maintaining roads, recovery of disabled vehicles, preparing river-crossing points, and preparing and destroying obstacles. The bucket at the rear of the vehicle is quite large and can excavate 200 cubic meters at once and lift 4 tons at once. The FV-180 also has a winch; this has a capacity of 8 tons and has 113 meters of cable that can be fed to the front or rear. On top of the vehicle is an earth anchor for self-recovery or pulling down obstacles; it has a rocket assist and can be shot to a distance of 91.4 meters, then reeled in or better, be lodged in obstacles once deployed. An FV-180 is issued with 10 charges for the rocket anchor. The anchor may also be attached to the winch cable. Indian vehicles have air conditioning, but Singapore vehicles have this, and British CETs did not have air conditioning until shortly before their deployment to Iraq. Between the superstructure and the dozer is a space that can be used to carry fascines or other large items; a pusher bar is also located there to help deploy fascines or roll-up road sections. Some of these vehicles also have a crane with a capacity of 4 tons. The bottom of the vehicle has a device to help hide the soil excavated. An auxiliary lifting attachment – a davit with a winch roller – can be fitted to the inside of the earthmoving bucket. While this allows the CET to then move backwards or forwards with a suspended load, the vehicle cannot move left or right when using the ALA. This, and the general weakness of the system, led to it's discontinuance in the 1990s.

The aluminum armor of the CET is unusual; it is double-walled on almost all surfaces, and thus is the equivalent of spaced armor. The double-walled construction is meant to quiet the vehicle while it works, and help keep the interior of the vehicle quiet (though it does not do so well in this regard). Power is provided by a Rolls-Royce C6FTR turbocharged diesel, developing 320 horsepower and a lot of torque. Transmission is automatic, and the FV-180 can be driven equally fast to the front or towards the rear. The FV-180 is amphibious with preparation; however this requires a special kit, and requires about 15 minutes. The CET has two propellers to propel it in the water and help fight currents.

The crew is seated with the driver in the front right, and the commander's cupola behind the driver. The cupola has all-around vision blocks. The weapon mount is optional; most British and Indian vehicles have it, but almost none of Singapore's FV-180s do. The CET has an NBC Overpressure system. The commander for the most part operates the equipment, but the driver has a set of limited controls for the equipment. Normally, use of the vehicle's equipment does not require the crew to leave the vehicle.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$124,371	D, A	800 kg	17.7 tons	2	15	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor*
158/64	40/16/6	418	113	Stnd	T4	HF6Sp HS4Sp HR4Sp

Fire Control	Stabilization	Armament	Ammunition
None	None	L-7A2 (C)	1000x7.62mm

*Floor AV is 2Sp.

GKN FV-434 Fitters Vehicle

Notes: Also known as the REME Fitters' Vehicle, this is an older repair vehicle used by England; design work began in the early 1960s and introduction was made in the mid-1960s. As yet, no export sales have been made or attempted. These vehicles have been partially replaced by the Challenger Repair and Recovery Vehicle, especially in tank units, and the FV-512/13 in armored units.

The FV-434 is based on the FV-432 APC, and cannot service vehicles larger than the Chieftain main battle tank (it is not powerful enough to carry the Challenger-series' engine or transmission), and even taking care of Chieftains is a stretch. It is basically similar to the FV-432, but has a load area at the rear of the hull roof for carrying large items. This load area is covered with a canvas tarpaulin supported by bows. On the right side of the hull is a crane with a capacity of 1.25 tons and a reach of 3.96 meters, or 3.05 tons at a 2.26-meter reach. A full range of tools is carried, along with workbench, vise, tow bars, and tow cables. The FV-434 does not have a winch, and it not means to recover vehicles (even itself). Light armored and unarmored vehicle repair is its purview.

On the right side of the hull is a crane with a capacity of 1.25 tons and a reach of 3.96 meters, or 3.05 tons at a 2.26-meter reach. A full range of tools is carried, along with workbench, vise, tow bars, and tow cables. The FV-434 does not have a winch. Though there are no blades or anchoring devices, the suspension can be locked when equipment such as the crane are used. These vehicles have been partially replaced by the Challenger Repair and Recovery Vehicle, especially in tank units.

The FV-434 is equipped with a fold-away work bench that opens to the rear of the vehicle, along with an attached, folding tent

that extends the work area by one meter. There is also an interior folding work bench inside the rear of the vehicle. Power is provided by a K60 Multifuel engine with 240 horsepower, and a manual transmission. The engine does not have high horsepower, but also a lot of torque. Toolsets include tracked and wheeled vehicle tools, pneumatic tools, and welding and cutting tools. (Once everything is loaded, along with a part of the crews' personal gear and ammo storage, not much room is left for any potential passengers.) Limited recovery can be done by towing or by the crane.

The FV-434 has a crew of driver, commander, and two mechanics, though the driver and commander are also qualified mechanics. The commander has a cupola with manual rotation and a pintle mount for a light machinegun. The driver is in the front left; the commander is directly behind and above the driver. The two other mechanics are seated inside the vehicle. The FV-434 has a small computer that primarily provides access to the many British Army vehicles' specifications. On the glacis is a cluster of four smoke grenade launchers on each side of the vehicle. A small "penthouse" can be erected over part of the rear deck of the vehicle, but this is limited in space by the installation of the crane.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$102,433	D, G, A	2.71 tons	17.75 tons	4	17	Passive IR (D)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
134/54	34/14	454	83	Stnd	T2	HF6 HS4 HR3

Fire Control	Stabilization	Armament	Ammunition
None	None	L-7A2 (C) or Bren L-2A4 (C)	1600x7.62mm

Alvis FV-512 MCRV/FV-513 MRV(R)

Notes: These related vehicles are also known as the Warrior Recovery and Repair Vehicles, or WRRV or the MCRV (Mechanized Combat Repair Vehicles). As the name suggests, they are recovery vehicle versions of the FV-510 Warrior IFV, and are used by Great Britain and Kuwait to support those vehicles and sometimes tanks. The primary difference between these vehicles is that the FV-512 does not have a winch, while the FV-513 does. The FV-512 may not have a winch, but it has a much greater stowage of repair parts.

Both vehicles have a crane with a 6.5-ton capacity in place of the turret of the FV-510, with a maximum reach of 4.52 meters. The FV-513 has a winch internally at the rear with a capacity of 20 tons (38 tons with pulleys installed), and has 100 meters of cable. The FV-513 also has a pilot winch on this vehicle that has 200 meters of cable and a capacity of 1.25 tons. On the front of the superstructure of both vehicles, there is a small one-man turret mounting a 7.62mm EX-34 ChainGun. The vehicles are air-conditioned, and have a small spade at the rear that is lowered to provide stability for the crane. NBC Overpressure with a collective backup is provided. These vehicles typically carry a wide variety of tools appropriate for their task of repairing tracked fighting vehicles.

Power for the vehicle and its components is provided by Perkins CV8 TCA 550-horsepower diesel, coupled to an automatic transmission. On either side of the forward superstructure are banks of four smoke grenade launchers.

In preparation for Operation Granby (the operational name for Britain's part in OIF), a decent layer of appliqué armor was added to British MCRVs.

Both of these vehicles can tow the GKN High Mobility Trailer. This four-wheeled trailer was purpose-designed for these vehicles, but may be towed by other vehicles capable of handling the weight. It weighs 5.5 tons, can carry 6.5 tons (approximately the weight of a Challenger power pack or two Warrior power packs), and is designed to provide a stable platform regardless of terrain conditions. The trailer's platform can be raised and lowered and provides a safe level platform for work when not connected for towing.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
FV-512	$216,956	D, A	1.2 tons	30 tons	5	23	Passive IR (D)	Shielded
FV-513	$197,232	D, A	1.2 tons	30.2 tons	5	23	Passive IR (D)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
FV-512/513	150/60	38/15	770	197	CiH	T4	TF4 TS4 TR4 HF20 HS6 HR6

Vehicle	Fire Control	Stabilization	Armament	Ammunition
(Both)	None	None	EX-34 ChainGun	1500x7.62mm

Alvis FV-4333 Stormer VLSMS (Vehicle Launched Scatterable Mine System)

Notes: This is a Stormer version (specifically, the Streaker) modified to carry the Minotaur mine-scattering system. Though the idea had been kicking around for quite a while, it not until Op Granby that six VLSMSs were built and deployed. The Alvis minelaying system was chosen from two finalists, including the US Volcano system; later Britain found it needed more minelayers – despite the availability of more modern systems, the British Army again chose the Streaker-based minelayer, but with the Volcano system instead. (For most purposes, the mines being emplaced are the same in either case. The British call this version the

Shielder, and it's primarily difference is the minelayer system. The only known other export version is the US Army, specifically the Rangers – they use it with the Volcano system.

The vehicle has NBC protection and air conditioning. Four smoke grenade launchers are mounted on either side of the vehicle. The rear of the vehicle is completely taken up by the mine system; there is, at best small nooks and crannies for gear, but the recommended way to go is to not store any equipment behind the engineer positions. Because of this, what space there is is given over to tightly-closable bins and cabinets, but invariably, most crew equipment will stowed on the outside of the vehicle. The vehicle's armor is aluminum, with the Minotaur's mine throwers being, if anything, made of thinner aluminum. The driver is on the front left hull; opposite him is the commander's manually-operated cupola with normally a MAG is fitted. The commander's cupola has all-around vision blocks. Eight are no magnification, but the center one has a wide-angle x10 magnification. The commander can aim and fire with hatches closed. The third crewmember sits in the right hull next to the commander hull facing to the rear, tending to the Minotaur's well-being. The driver has a single dial-channel day/night wide-angle vision block ahead of him.

Vehicle Overpressure systems are not fitted, as the operator may often have to get up to unstuck and unkink things. A collective NBC system is fitted instead. The vehicle is powered by a Perkins 250-horsewpower multifuel, with extra batteries to allow preparation and reloading to be assisted by mine system. At first, transmissions were manual, but these had been replaced with automatic transmissions in time for Op Granby.

Another addition for Op Granby is a modicum of a layer of steel plate appliqué armor.

The Minotaur system can lay 600 mines per hour, usually of the anti-tank variety. The hull is longer and wider than the standard Stormer, but the automotive components are identical, and the extra size being taken up by the minelaying mechanisms and actual mines. The mines are stored in replaceable palletized loads that can be simply replaced and removed as necessary. The throwers basically consist of tubes containing the mines, which are thrown by a deployment charge; the commander has control of scattering or not scattering as desired. The Volcano is similar in concept, but uses (usually) more modern mines and can dispense 960 mines at a time (though still at the rate of 600 per hour). I haven't been able to find out which mines are used on the VLSMS, but they appear to have a nominal weight of 10 kg each. Mines will normally be deposited on the ground and not dug in; digging them in requires the intervention of humans or a trench-digging vehicle.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
VLSMS (with Minotaur)	$205,811	D, A	400 kg	12.7 tons	3	15	Passive IR (D, C)	Shielded
VLSMS (with Minotaur & Appliqué)	$207,832	D, A	251 kg	15.08 tons	3	23	Passive IR (D, C)	Shielded
VLSMS (with Volcano)	$220,643	D, A	310 kg	13.6 tons	3	15	Passive IR (D, C)	Shielded
VLSMS (with Volcano & Appliqué)	$222,564	D, A	103 kg	17.46 tons	3	23	Passive IR (D, C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor*
VLSMS (with Minotaur)	164/66	41/17	770	87	CiH	T4	TF3 TS3 TR3 HF8 HS4 HR4
VLSMS (with Minotaur & Appliqué)	138/56	34/14	770	103	CiH	T4	TF4 TS4 TR4 HF14 HS7 HR6
VLSMS (with Volcano)	153/62	38/16	770	95	CiH	T4	TF3 TS3 TR3 HF8 HS4 HR4
VLSMS (with Volcano & Appliqué)	121/49	30/12	770	122	CiH	T4	TF4 TS4 TR4 HF14 HS7 HR6

Vehicle	Fire Control	Stabilization	Armament	Ammunition

VLSMS	None	None	L-37A2 (C), Minotaur or Volcano Minelayer System	1000x7.62mm, 600x A-T Mines or 960 Mines

*The “turret” rating is for the raised section holding the mine dispensers, and their contents.

Vickers ARRV

Notes: These are Armored Repair and Recovery Vehicles based on the Vickers Mk 3 main battle tank. The users of the Vickers ARRV are the same as those who use the Vickers series of tanks, including Kenya, Kuwait, Nigeria, and Tanzania.

The Vickers ARRV lacks the heavy and composite armor of the Vickers Mk 3 (though it’s protection is still substantial), and instead of a turret has a raised superstructure mounting a crane with a capacity of 4 tons (just enough to lift a tank power pack). Mounted to the left of the driver in the front of the vehicle is the main winch. It has 122 meters of cable and has a capacity of 25 tons, or 65 tons with block and tackle. When using the winch, an earth anchor is normally employed to brace the vehicle. There is also an auxiliary winch at the rear with a capacity of 4.06 tons and 250 meters of cable. The Vickers ARRV normally carries a full range of recovery and repair equipment, including welding and cutting gear, an air compressor, a fuel pump, a large set of tools (basic, wheeled vehicle, tracked vehicle, small arms, heavy ordinance), a tow bar, block and tackle, and various ropes, cables, and chains. The Vickers has a hatch on the front right deck for the driver, a commander's cupola on the left superstructure deck with an externally mounted machinegun that can be aimed and fired from within the vehicle, and a large hatch for the crew to work with the crane. A flat area on the rear deck can carry a complete MBT power pack.

Power is provided by a Detroit Diesel 12V-712T 720-horsepower turbocharged diesel. Vickers will instead equip the Vickers ARRV with a Perkins CV12 800E turbocharged diesel developing 800 horsepower. (No actual orders for a Vickers ARRV with this engine have been made, but the stats have been worked out anyway.) The Vickers ARRV is known for its exceptional suspension. Three of Kenya’s Vickers ARRVs are unusual – they are not equipped with cranes, and are meant to be primarily recovery vehicles instead of repair and recovery vehicles, and the main winch can pull 75 tons with block and tackle. On each bumper, aimed slightly outward, is a cluster of six smoke grenade launchers. The driver is on the front left, and the commander behind and opposite of him, with a manually-operated cupola with a weapon mount.

The driver is on the front right, with the commander opposite him on the front left. As noted above, there is a large hatch on the left rear, running to the center; this is normally meant to facilitate working with the crane. (Supposedly, Kenyan ARRVs that do not have a crane use the extra space, modified into a rack for water and food and various oddments of personal items.)

Twilight 2000 Notes: Prewar sales went only to Kenya, Nigeria, and Tanzania, and even then only in small numbers, but some of these vehicles were produced during the Twilight War, and a few of these went to British forces in Europe.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Vickers ARRV	$875,340	D, A	3 tons	36.8 tons	4	23	Passive IR (D, C), WL Spotlight (C)	Shielded
Vickers ARRV w/800hp	$876,240	D, A	3 tons	36.8 tons	4	23	Passive IR (D, C), WL Spotlight (C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Vickers ARRV	168/68	42/17	1000	262	Stnd	T6	HF76 HS10 HR8
Vickers ARRV w/800hp	177/72	44/18	1000	277	Stnd	T6	HF76 HS10 HR8

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Vickers ARRV	None	None	L-7A2 (C)	2600x7.62mm

MTP-1

Notes: This armored recovery vehicle is a variant of the MT-LBu used by Bulgaria. It is used to recover and repair vehicles of a similar size and weight. The roof has a telescopic crane that can lift 3 tons, and can be extended over the entire vehicle to a maximum of 3.4 meters. (The operators can also restrict weight lifted to 2 tons, in which case the crane may be extended to 5 meters.) The rear of the vehicle has a large blade similar to that on the engineering variant of the MT-LB that is used to brace the vehicle when using the crane. It can also be used to prepare vehicle entrenchments, and the MTP-1 can prepare a hull-down position for a main battle tank in 110 minutes. The MTP-1 also has a winch that can pull 30 tons, or 10 tons when not braced by the dozer blade. The MTP-1 is fully amphibious. The cupola of the MT-LBu is retained.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$71,058	D, A	2.5 tons	14 tons	2+3	8	Headlights	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
120/84	25/20/2	450	71	Stnd	T3	HF4 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT or DShK (C)	2500x7.62mm or 1200x12.7mm

M-113 Engineering Specially Equipped Vehicle (ESEV)

Notes: The ESEV is an M-113 APC modified with the use of a kit for combat engineers. The ESEV features an improved layout for 8 combat engineers plus their equipment; a hydraulic auger that may dig in earth, asphalt, and frozen ground to a depth of 3.048 meters and 203mm wide; hydraulic power tools (a chain saw, jack hammer, and an impact wrench that can also be used for wood boring); and a modified ramp that can be used as a working platform (and may hold up 500kg). Only the Canadian Army uses the M-113 ESEV. The ESEV may use the same add-on armor as the standard M-113.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$104,969	D, A	2 tons	11.65 tons	2+6	7	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
120/84	25/20	360	117	Stnd	T2	HF6 HS4 HR4

Fire Control	Armament	Ammunition
None	M-2HB (C)	2000x.50, Engineer Demo Chest

Type 84

Notes: This is a Chinese AVLB based on the Type 69 main battle tank chassis. The bridge is derived from that of the German Biber AVLB (see *NATO Combat Vehicle Handbook*), with alterations to mate it to Chinese-made bridge laying system. The total length of the bridge is 18 meters (16 meters usable), with a load limit of 40 tons. There is also a narrow inner track to the bridge, with a load limit of 8 tons. 3-4 minutes are required to lay the bridge, and 3-4 minutes are required to recover it. The bridge itself weighs 8.5 tons.

The Type 84 has a crew of three; one of which is the driver in the front left side behind the glacis plate. The other two are the commander, who is in the right of the hull with all-around vision blocks and a raisable pivoting day/night periscope. When the bridge is deployed, the commander may mount a machinegun on the provided external mount. The bridge operator is in the center of the vehicle, again with all-around vision blocks and a day/night periscope. The chassis is basically a modified Type 69 MBT chassis, Power is provided by a Type 12150L-7BW diesel developing 580 horsepower, with a manual transmission.

If necessary, the Type 84 AVLB can operate without a commander, the position being left empty. However, the bridge operator cannot use the machinegun from his position, nor can he use the bridge controls from the commander's position.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$430,158	D, A	315 kg	38.5 tons	3	19	Passive IR (C, BO)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor**
124/87	25/20	935+380	167	CiH	T6	TF4 TS4 TR4 HF40 HS10 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	PK (C)	1500x7.62mm

Type 85 Armored Repair Vehicle & Recovery Vehicle

Notes: The Type 85 Armored Repair Vehicle is a vehicle based on the chassis of the Type 85 armored personnel carrier, designed for vehicle repair teams. This vehicle has a raised superstructure topped with a cupola-mounted machinegun. The vehicle has a 5 kW generator, basic, wheeled vehicle, tracked vehicle, small arms, and heavy ordinance tools, a welding set, air and oil filter cleaners, and an inertia dynomometer. It normally carries a wide selection of spare parts.

The Type 85 Recovery Vehicle is a Type 85 armored personnel carrier with a hydraulic crane that has a capacity of 1 ton. Also included are basic, wheeled vehicle, and tracked vehicle tools, a welding set, a 5kW generator, excavating tools, an air compressor, a tow bar, ropes, and cables. They tend to be found in conjunction with Type 85 ARV noted above.

As a variant of the Type 85 APC, the two engineer variants have a Deutz BF8L 413F turbocharged diesel developing 320 horsepower; their suspension is by torsion bars and the transmission is manual. The crew enter and exit through a large door in the rear face; a table can also be folded down outside the vehicle to create more work space. The gunner (who is also a mechanic, like the rest of the crew) is on the center roof, manning a machinegun. The gun has full armored gun shields, with AV2. The driver is on the front left; he has three vision blocks to the front, and the center front can be replaced with a night vision block. A third hatch, behind the driver's hatch, is normally manned by the chief mechanic and has all-around vision blocks. The two oblong hatches are deleted, though there is a smaller hatch on the left side to the rear of center.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
ARV	$89,500	D, A	1.5 tons	15 tons	5	14	Active/Passive IR	Enclosed
RV	$269,100	D, A	1.5 tons	15 tons	5	16	Active/Passive IR	Enclosed

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
(Both)	157/110	44/30/4	450	114	CiH	T4	TF2 TS2 TR2 HF6 HS3 HR2

Vehicle	Fire Control	Stabilization	Armament	Ammunition
(Both)	None	None	DShK (G)	1120x12.7mm

Type 653/653A

Notes: The Type 653 (also known as the Type 84 or WZ-653A) series is an armored recovery vehicle based on the chassis of the Type 69 tank. The Type 653A is basically a Type 653 with a heavier, more powerful crane. The turret of the Type 69 is replaced with a raised superstructure, offset to the left of the vehicle. To the right of the vehicle is a crane; on the Type 653, this has a capacity of 10 tons, while on the Type 653A, the capacity is 20 tons. Both cranes have a reach of 6 meters and can rotate 360 degrees; the base is on the front right side. To the front of the vehicle is a large dozer blade used for bracing and for earthmoving (it may excavate 100 cubic meters per hour on dry soil, or use the blade as a brace if lifting heavy items). The Type 653 series also has a hydraulic winch with a capacity of 70 tons with 130 meters of cable (160 meters on the Type 653A). The Type 653 also has an auxiliary winch with a capacity of 10 tons. The Type 653 is equipped with a variety of tools for work on tracked and wheeled vehicles, and also carries excavating tools, as well as a large number of stowage boxes where other tools may be kept (other tools must be bought separately). The Type 653 series is in use by China, Bangladesh, Iraq, Pakistan, and

Thailand. The vehicle carries 100 kg of random vehicle parts, with the accent on tracked vehicle parts. A small amount have also been supplied to Kuwait along with their new PLZ-45 SP howitzers.

The commander is at the right of the superstructure; he has a modified position for his gun which may be aimed and fired from within the vehicle, with it buttoned up. The commander has all-around vision blocks and one with a day/night channel, and is manually operated. The driver is on the front left of the front. At the rear of the superstructure is a large hatchway, one meter long and two meters wide, which has the control positions for the winch and crane. The two seats in this position may be swiveled 360 degrees, and may also move up and down. The operators have vision blocks to the rear and to each side of the compartment. One more crewmember is inside the hull, under the superstructure. As with the Type 69, the vehicle is powered by a Type 12150L-7BW diesel developing 580 horsepower, with a manual transmission.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Type 653	$929,762	D, A	3 tons	38 tons	5	17	Passive IR (D, C)	Enclosed
Type 653A	$978,351	D, A	3 tons	42 tons	5	17	Passive IR (D, C)	Enclosed

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Type 653	124/87	25/20	935+380	167	Stnd	T6	HF40 HS10 HR8
Type 653A	118/83	24/20	935+380	176	Stnd	T6	HF40 HS10 HR8

Vehicle	Fire Control	Stabilization	Armament	Ammunition
(Both)	None	None	DShK (C)	500x12.7mm

MTU-34

In the post-World War 2 world, the Soviets were slow on the uptake on new AVLBs and the Czechs has a tradition of adopting their own designs or modifying Soviet designs. The MTU-34 is based on the T-34 tank, with the turret removed and replaced by a fold-out two-section bridge, able to span 20 meters and weighting 8 tons, and it can handle 40 tons. The crew is only two, a driver and a commander/bridge operator. The driver has a position in the glacis plate, with a large raiseable hatch with a vision block in it, that can be propped open to a straight-out position or closed. The hatch, when open, exposes the entire upper body. The commander/bridge operator is in a manually-operated cupola, with all-around vision blocks. There is no weapon mount or weapon carried. The top is largely taken up with the bridge and its erection system. Engine is the V-2-34 38 8 L 500 horsepower engine, with a manual transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$894,870	D, A	400 kg	30.5 tons	2	11	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor
131/92	36/25	480+360	143	CiH	T4	TF4 TS4 TR4 HF37 HS13 HR7

Fire Control	Stabilization	Armament	Ammunition
None	None	None	None

*The "turret" is the bridge; no crew casualties are possible, and such results should be treated as misses. If the bridge is deployed, Config is Stnd.

MTU-55 AVLB

Notes: The MTU-55A is a Czech AVLB is based on the T-55A chassis. It is used in place of the MTU-20 in Czech service and alongside the MTU-20 in Russia, India, Iraq, Yugoslavia, and in some Middle Eastern countries. It uses a stronger bridge that can support 50 tons. If necessary, a bridge from an MT-72 or MTU-72 can be substituted for the normal bridge carried by the MTU-55A. The normal bridge can span a gap of 18 meters, weighs 6.5 tons, takes 3 minutes to lay, and 3-8 minutes to recover. The bridge can support a vehicle weighing 50 tons.

A pre-production version, the MTU-55, is still in use by some third-world countries. It is often (erroneously) referred to as the MT-55L. It uses the bridge of the MT-34 on the T-55A chassis; This bridge is actually longer and heavier than the standard bridge, able to span 20 meters and weighting 8 tons, though it can handle only 40 tons.

As with the T-55A, the MTU-55 series has a V-55 38.88-I 581 horsepower diesel engine with a manual transmission and suspension by torsion bars. The two-man crew consists of a driver, on the front left, and a commander/bridge operator. The driver has three vision blocks to the front and slightly to the sides, and the commander has a manually-rotating cupola with all-around vision blocks. No weapon mount is provided.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MTU-55	$1,015,332	D, A	500 kg	36 tons	2	19	Headlights	Shielded
MTU-55A	$1,142,249	D, A	500 kg	34.5 tons	2	19	Headlights	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor
MTU-55	124/87	31/22	580+400	167	CiH	T6	TF4 TS4 TR4 HF63 HS12 HR8
MTU-55A	124/87	31/22	580+400	167	CiH	T6	TF4 TS4 TR4 HF63 HS12 HR8

*The "turret" is the bridge; no crew casualties are possible, and such results should be treated as misses. If the bridge is deployed, Config is Stnd.

MV-90

Notes: This is a Czech minelaying vehicle based on a BVP-1 chassis (the Czech version of the BMP-1). The mines are carried internally, and dispensed through a chute that extends out of the right back door. The vehicle can lay either PT-Mi-U or PT-Mi-Ba mines at a combat movement of 4. This vehicle was new issue to the Czech Army in 1997. The engine is a UTD-20 turbocharged diesel, essentially an updated version of that of the BVP-1, developing 300 horsepower. The hull has no turret or the weapons suite associated with it, but does have a raised superstructure.

Twilight 2000 Notes: This vehicle does not exist in the Twilight 2000 timeline.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$421,715	D, A	400 kg	14.4 tons	3	11	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
153/107	42/30/4	460	105	Stnd	T2	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C), Minelayer	1000x7.62mm, 100xPT-Mi-U or PT-Mi-Ba Mines

VT-55A

Notes: This vehicle was type standard in the Czech Army until the advent of the VT-72B; it is still used to recover lighter tanks and other armored vehicles. It is based on the chassis of the T-55 tank, and is similar to the Russian BTS-T-55-T recovery vehicle, and even more so, to the MTU-55A.

The turret of the T-55 is removed, and the opening replaced with steel plate and a cupola for the commander. The cupola has manual traverse , but the machinegun cannot be mounted unless the bridge is already deployed. On the right side of the hull roof is a crane that can lift 1.5 tons. On the rear of the hull deck is a platform that can carry a load of 3 tons. There are two winches; the main winch is driven by the engine, and can pull 25 tons with 200 meters of cable. The auxiliary winch has its own motor, can pull 800 kg, and has 400 meters of cable. The front of the vehicle mounts a full-width dozer blade that can excavate 150 cubic meters per hour. The VT-55A can normally ford water of 1.4 meters depth, but can be equipped with a snorkel allowing the vehicle to ford 5 meters for 1000 meters. These vehicles typically carry several tow bars and a 4.2 meter tow cable, as well as welding equipment and toolkits appropriate to its purpose of recovering and repairing smaller tanks and armored vehicles. The crew compartment has a heater.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,546,923	D, A	500 kg	36.45 tons	3	20	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor
124/87	31/22	812	167	CiH	T6	TF4 TS4 TR4 HF67 HS16 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	3000x7.62mm

*The "turret" is the bridge; no crew casualties are possible, and such results should be treated as misses. If the bridge is deployed, Config is Stnd.

KAM-1

Notes: This Finnish recovery vehicle is a conversion from the T-55 chassis. The turret of the T-55 is removed and replaced with a large turntable mounting a heavy-duty crane. The crane has a capacity of 22 tons with a reach of 6.7 meters. The winch has a capacity of 36 tons in a straight pull, or 72 tons with block and tackle, and has 140 meters of cable. The vehicle is equipped with a dozer blade, a towing jib and tow bar, ropes, and a wide variety of tools, including wheeled vehicle, tracked vehicle, excavating, small arms, heavy ordinance, basic, and welding. The vehicle has the ability to generate smoke by injecting diesel into its exhaust.

Twilight 2000 Story: This vehicle was just beginning to be produced before the Twilight War, and there are perhaps 20 of them in all Finland.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$112,371	D, A	2 tons	44 tons	2	14	Active/Passive IR, WL Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
92/64	20/15	812	215	Stnd	T6	HF67 HS16 HR8

AMX-10 ECH

Notes: The AMX-10 ECH is the repair vehicle version of the AMX-10P APC. It retains the full armament of the standard AMX-10P, but instead of an infantry squad carries a reduced crew of mechanics. The driver is seated at the front left of the hull, and there is a large drop ramp in the rear of the vehicle with a door in it. On the right side of the rear deck is a crane with a capacity of 6 tons. The operator has a small roof hatch that he uses when working with this crane. When the crane is used, jacks are lowered under the rear of the hull to brace the vehicle. Other equipment carried includes a full range of tools and a pair of jacks with the ability to jack up one side of a 15-ton vehicle. Note that the AMX-10 ECH does not have a winch, does not normally carry tow bars or tow cables, and in general does not have the muscle for recovery operations.

France, Saudi Arabia, Greece, Mexico, Qatar, and the United Arab Emirates use the AMX-10 ECH.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$224,143	D, A	2.5 tons	13.8 tons	5	9	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
107/75	25/15/2	528	78	CiH	T2	TF3 TS2 TR2 HF4 HS3 HR2

Fire Control	Stabilization	Armament	Ammunition
+1	Basic	20mm M-693 autocannon, AAT-F1	576x20mm, 2000x7.62mm

AMX-13 CPP

Notes: This is an AVLB based on the AMX-13 chassis. The bridge can span a gap of 14.01 meters is suitable only for light vehicles, able to support 25 tons. The bridge weighs 4.7 tons and takes 3 minutes to emplace or recover. Two stabilizers are lowered at the rear before the bridge is emplaced or recovered.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$66,106	G, A	400 kg	19.7 tons	3	11	Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
88/61	20/15	480	91	CiH	T3	TF4 TS4 TR4 HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	AAT-F1 (C)	2000x7.62mm

AMX-13 VCG

Notes: This is a Combat Engineer Vehicle version of the AMX-13. The VCG has a 2.85x0.7m dozer blade capable of excavating 45 cubic meters per hour, An A-frame crane with a 4.5-tonne capacity, a winch with 40m cable able to pull 20 tons, 2 smoke projectors, 1 smoke discharger, 2 mine detectors, an electric drill, a hammer drill, a power saw, and an integral 4.5Kw generator. The turret has been replaced with a raised superstructure with an M2HB fired from inside or outside the vehicle. There are two hatches on the roof and hatches on the sides, and a driver's hatch on the front left deck.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Gas Engine	$82,976	G, A	2 tons	17.6 tons	3+6	10	Headlights	Shielded

Diesel Engine	$83,132	D, A	2 tons	17.8 tons	3+6	10	Headlights	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Gas Engine	100/70	20/15	410	103	Stnd	T4	HF6 HS4 HR4
Diesel Engine	109/76	25/15	410	92	Stnd	T4	HF6 HS4 HR4

Vehicle	Fire Control	Armament	Ammunition
(Both)	None	M-2HB (C), 2xSmoke Grenade Projectors	1000x.50

AMX-30D ARV

Notes: This is an armored recovery vehicle version of the AMX-30 tank. The turret is removed and replaced with a raised superstructure. The driver sits at the front and slightly to the left side of the vehicle, with the commander to his with a cupola mounting a machinegun. The machinegun may be aimed and fired when the vehicle is buttoned down via a 10x periscope. To the rear of the commander's cupola is a hatch for the two mechanics. At the front of the hull is a dozer blade used for earthmoving and to brace the vehicle during crane and winching operations.

The crane is on the front left side and can lift 12 tons through 240 degrees, or 15 tons when lifting while the crane is positioned straight forward and the dozer blade is lowered. (There is a version used only by France, called the AMX-30DI, which can lift 15 tons through the entire 240 degrees.) There is a platform on the rear of the superstructure to carry engines and other large assemblies. The main winch is located in the center of the hull, with the cable leading out of the front of the hull. This winch has a 35-ton pull with 100 meters of cable. It cannot be overstressed, as it stops automatically when this 35-ton limit is reached. The auxiliary winch has 120 meters of cable and has a 3.5-ton pull. The crew compartment has a heater, and a snorkel can be installed that allows fording of up to 4 meters depth.

The AMX-30D is built by France and used by that country, as well as most countries that use the AMX-30 tank (such as Chile, Cyprus, Greece, Iraq, Qatar, Saudi Arabia, Spain, United Arab Emirates, and Venezuela).

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$120,213	D, G, A	3 tons	36 tons	4	13	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
133/93	30/20	1100	259	Stnd	T6	HF58 HS14 HR8

Fire Control	Stabilization	Armament	Ammunition
None	+1	AAT-F1 (C)	4000x7.62mm

AMX-30 AVLB

Notes: This is an AVLB version of the AMX-30 main battle tank. The hull is virtually unchanged from the base vehicle, but the turret is removed and replaced with a bridge that can span a gap of 20 meters. The bridge can support 50 tons and takes 5 minutes to lay or recover. The bridge itself weighs 8.5 tons. The AMX-30 AVLB is not used by France, but is used by Saudi Arabia.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$279,144	D, G, A	315 kg	42.5 tons	3	8	Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
116/81	25/15	1100	257	CiH	T6	TF4 TS4 TR4 HF58 HS14 HR8

AMX-30 EBG

Notes: This is a CEV version of the AMX-30. The EBG has a dozer blade capable of excavating 120 cubic meters per hour, a winch capable of pulling 20 tons with 40m of cable, and a hydraulic arm with pincers capable of lifting 15 tons. The EBG has a two-tier turret with a MAG MG and 4 smoke projectors on the top tier, and a 142mm demolitions gun and 4 coaxial mine throwers on the bottom tier. The two tiers are able to rotate independently. The EBG has an integral 50Kw generator. The driver's hatch is located on the left front deck, and the commander's and loader's hatches are located on the turret deck. The gunner uses the loader's hatch. The AMX-30 EBG, like other vehicles of its kind, has been removed from active service in its country.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
700 hp Engine	$204,892	D, G, A	500 kg	38 tons	3	17	Passive IR	Shielded
800 hp Engine	$205,455	D, G, A	500 kg	38.4 tons	3	17	Passive IR	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
700 hp Engine	127/89	25/20	1100	259	Trtd	T6	TF23 TS8 TR6 HF58 HS14 HR8
800 hp Engine	141/99	30/20	1100	296	Trtd	T6	TF23 TS8 TR6 HF58 HS14 HR8

Vehicle	Fire Control	Armament	Ammunition
(Both)	None	142mm Demolitions Gun, AAT-F1 (C), 4xMine Throwers	15x142mm, 4000x7.62mm, 40xMines

AMX VCI Recovery Vehicle

Notes: This is a recovery vehicle meant to recover and repair AMX VCI vehicles and similar-sized vehicles. The basic chassis is fitted with a raised section in the center of the hull. To the left of this superstructure is a crane with a capacity of 6 tons and the ability to swivel through 240 degrees. The main winch leads out through the front of the hull and has a capacity of 18 tons with 100 meters of cable. The auxiliary winch is in the rear of the hull and has a capacity of 3.5 tons with 120 meters of cable. The AMX VCI RV is equipped with basic, tracked vehicle, wheeled vehicle, small arms, and heavy ordinance tools, an air compressor, a welding set, and excavating tools.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$78,965	D, A	3 tons	18 tons	4	9	Passive IR, WL Spotlight	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
95/67	20/15	410	92	Stnd	T3	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	AAT-F1 (C)	2000x7.62mm

AMX VCG

Notes: This is the combat engineer vehicle version of the AMX VCI, used by many of the countries that use the AMX VCI. The vehicle is equipped with an A-frame crane that deploys over the front of the vehicle; this crane has a capacity of 4.5 tons. When the crane is not in use, it is split at the top and folded on either side of the hull. The vehicle is also equipped with a forward winch, with a capacity of 4.5 tons and 63 meters of cable. On the front of the vehicle is a dozer blade to brace the vehicle or to prepare fighting positions. The vehicle has a 3kW generator to power tools when the engine is off. The AMX VCG is issued with an engineer demolitions chest, welding and cutting tools, an air compressor, power tools, basic tools, and excavating tools.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$104,853	D, A	2 tons	16 tons	3+7	8	Passive IR, WL Spotlight	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
105/73	20/15	410	92	Stnd	T3	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

Leclerc ARV (DNG)

Notes: This armored recovery vehicle was originally produced for Abu Dhabi, but France later decided to buy some for its own army. It is a conversion of the EPC Leclerc main battle tank. The turret has been removed and replaced with a raised superstructure, and the vehicle has been lengthened so it has seven roadwheels on each side instead of six. The right side of the vehicle carries a long crane with a reach of 7.9 meters over 260 degrees that can lift 30 tons. The vehicle has a main winch with a capacity of 34 tons and 160 meters of cable, and an auxiliary winch with a capacity of 15 tons and 160 meters of cable. To the rear of the superstructure is a platform that may carry a complete Leclerc power pack (approximately 4 tons). On the hull front is a dozer blade for bracing the vehicle. A 10kW diesel generator is provided to power tools, the winches, and crane when the engine is turned off. The Leclerc ARV carries a welder, air compressor, electric and electronic repair tools, and a complete set of tools to service main battle tanks and other armored vehicles. The crew compartment is air-conditioned and includes a chemical toilet. The vehicle mounts the Galix close-defense system, which automatically lays a smoke screen and infrared countermeasures if the vehicle is threatened by enemy missiles or targeted by lasers.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$245,667	D, A	4 tons	59 tons	3+1	21	Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
170/119	35/25	1500	557	Stnd	T6	HF140 HS28 HR19

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1000x.50

Rheinmetall BRP-1 Biber

Notes: This German AVLB is based on the hull of a Leopard 1 tank, topped with a bridge and the equipment to deploy it. The RFD was issued in 1965, and first issue was 1968. 105 were built, but it is getting long in the tooth, and may be replaced in the near future by the PBS-2. Most of these vehicles are used by Germany, but small numbers are used by Australia, Canada, Denmark, and the Netherlands. Some 64 were also were also built by Italy, where they were license-produced. Unusually, in NATO operations, spare bridges for Danish Bibers are to be carried and delivered by German Army personnel on IVECO Magirus MP-260E37W heavy trucks.

The driver is in the normal Leopard position at front right of the hull and the commander/bridge operator in the center of the hull. The bridge can span a gap of 20 meters and has a capacity of 50 tons or 60 tons if the vehicles move across the bridge with care; it is made of aluminum. It may be deployed or recovered from either end, requiring 3 minutes to deploy and 7 minutes to recover. It deploys cantilever (slide-out) style instead of the scissors fashion of most AVLBs. The crew can lay the bridge with the crew under armor with hatches closed. The advantage of the cantilever design is that it's deployment cannot be seen over a long distance; the disadvantage is that it is mechanically more complex and takes longer to recover. By itself, the bridge weighs 9.94 tons. The dozer blade on the front of the Biber is deployed before emplacing or recovering the bridge. The Biber is not issued with a weapon mount, but many crews have retrofitted their vehicles; in most such cases, the weapon cannot be mounted unless the bridge has been deployed. The crew has an NBC Overpressure system with a vehicular NBC system backup.

The hull is almost identical to that of a Leopard 1, other than the closing off of the turret mount and lack of the associated hardware, though the commander/bridgelayer does have a manually-operating cupola with all-around vision. Power is provided by an MTU MB-873 Ca-501 multifuel engine developing 830 horsepower, with an transmission. Suspension is by torsion bar and two sets of hydraulic shocks.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$954,956	D, A	400 kg	45.3 tons	2	32	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor*
145/101	36/25	995	307	CiH	T6	TF4 TS4 TR4 HF38 HS10 HR6

*The "turret" is not a turret as such; it is the carried bridge. If the bridge is deployed, the Config is Stnd. No crew casualties are possible on a "turret" hit; treat such results as misses.

Rheinmetall BPz-3 Büffel

Notes: This is a newer armored recovery vehicle based on the Leopard 2 chassis. The Büffel is used by Germany and the Netherlands; Sweden also had some delivered to them in late 2003. Greece, Canada, Singapore, and Switzerland also use the Buffel. Deliveries to the German Army began in 1988. Components are the same as on some other countries' vehicles, like the South Korean winches, cranes, and dozer blade, which are also used by France on the Leclerc DNG.

The turret is removed, and from the front to the center of the vehicle is a raised superstructure. The Büffel has a crane on the right side of the superstructure that can traverse through 270 degrees and can lift 30 tons or pull 70 tons. This crane cannot be overloaded, as it will refuse to function at a higher load. The vehicle has a main winch with 180 meters of cable and a pulling force of 35 tons. This winch is mounted on the front hull and does not require the use of the dozer blade, since it is designed to distribute forces over the entire vehicle. It too cannot be overloaded. The Büffel also has an auxiliary winch with 280 meters of cable and a 650kg capacity. The Büffel has two tow bars, including one for quick recoveries that is attached to the dozer blade. Cutting and welding gear is carried along with a full set of tools. There is a cradle over the engine compartment to carry large assemblies such as engines. The Büffel has a crew heater and a bilge pump for deep fording operations (though it is not amphibious). The hull mounts 16 smoke grenade launchers. The Büffel is capable of towing 64 tons.

It is often found towing a trailer specially designed for it, carrying spare parts and more tools. This trailer is four-wheeled, partially powered, weighs 3 tons, can carry 7.5 tons, and does not affect the Büffel's mobility.

Power is provided by an MTU MB-837 Ka-501 developing 1500 horsepower, along with an automatic transmission. The commander has a manually-operated cupola with all-around vision in the center top behind the driver's position; slightly to the rear and the right is the crane operator has a hatch on the left rear deck in front of the engine. The crew has an NBC Overpressure System and has a vehicular NBC backup.

In 2011, four German BPz-3A1s were modified to the BRP-3A1 for operations in Afghanistan. Canadian BRP-3A1 were actually deployed first, in 2007. Modifications included an increase in armor through MEXAS appliqué, a titanium plate of spaced armor on the floor, sides with armored skirts, The BPz-3A1 has a radio jammer, which prevents phone, opposition radios, and items like walkie-talkies and electrical detonation systems from detonating (two levels more difficult). These jammers are optimized for civilian frequencies, including TV signals, though some intervehicular radios are also affected. at higher frequencies. Available machinegun ammunition was increased dramatically. The commander's position was ringed with AV2 gun shields. The BPz-3A1 is usually supplemented with cage armor which covers the glacis, sides, and rear.

The BPz-3A1 uses the same engine and transmission, as well as power train, and suspension, as the BPz-3. The crew has the same amenities as the BPz-3, with the addition of a 50-liter drinking water tank and an air conditioner.. Like the BZp-3, the Buffel can ford a body of water 4 meter deep.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

BPz-3	$564,279	D, G, A	4.1 tons	54.3 tons	3	29	Active/Passive IR (D, C)	Shielded
BPz-3A1	$689,048	D, G, A	4.1 tons	59 tons	3	29	Active/Passive IR (D, C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor*
BPz-3	196/137	49/34	1620	553	Stnd	T6	HF193 HS25 HR15
BPz-3A1	192/134	48/34	1620	590	Stnd	T6	HF203Cp HS33Cp HR25Sp**

Vehicle	Fire Control	Stabilization	Armament	Ammunition
BPz-3	None	None	MG-3 (C)	2375x7.62mm
BPz-3A1	None	None	MG-3 (C)	4750x7.62mm

*The addition of bar/slat armor means that 5 of the AV is the cage. The cage is not like normal spaced armor; it stops only 1d6 armor instead of 2d6. For the front and sides, the GM should assess the damage reduction from the cage, then the composite armor.

**Floor Armor is 14Sp.

Krauss-Maffei Pionierpanzer PiPz-1

Notes: This is an armored engineer vehicle developed from the Bergepanzer. The crane is retained but has special attachments to allow work with mines, demolition charges, and special tools to build and destroy fortifications. The Pioneerpanzer has no generator or fuel pump, but has a 700mm auger able to dig to 3.75 meters, a dozer blade, a 70-ton winch, and a digging bucket that can lift 2 tons. On the right side of the upper hull is a hoisting winch that has 100 meters of cable and a capacity of 20 tons. The Pioneerpanzer typically carries a wide variety of excavation tools and attachments for its crane, as well as a welding set, a 5-meter ladder, 117kg of plastic explosives, 10 engineer demolitions sets, and a variety of mines (up to 50). The plow can have a set of ripping teeth attached to it.

The vehicle has no turret but has a raised superstructure, topped with a commander/crane operator's manually-rotating turret with all-around vision blocks. Power is provided by an MTU MB-873 Ca-501 multifuel engine developing 830 horsepower, with an automatic transmission. Suspension is by torsion bar and two sets of hydraulic shocks. The Pionierpanzer has a secondary role as an ARV, primarily vehicle recovery. The dozer blade can excavate 200 cubic meters per hour, with a maximum width of 3.75 meters. The ripping teeth can rip up roads or pull up train tracks, of pull down electrical of communications poles; four such attachments may rip to 50mm, eight may rip to 400mm. . The crane has a ladder on it to assist in attaching tools. The crew is protected by an NBC Overpressure system and personal gas masks.

The PiPz 2 Dachs (Badger) is an upgrade of the PiPz-1, with conversions being done by MaK in the 1990s, and continuing production done by Rheinmetall. In addition to vehicles being sold, a kit was sold for upgrade purposes to countries wishing to do their own upgrades or do them on retiring Leopard 1s. Most conversions, however, were done by MaK, or MaK teams sent to the receiving countries. They were first brought up to like-new status. A new dozer blade (similar to the old one in concept, but stronger and more effective) and a new hydraulic system was fitted. The excavator/tool arm is able to rotate 360 degrees, but for practical purposes, is limited to 270 degrees. The driver has upgraded night vision; the commander/arm operator also have night vision. The commander is shifted to behind the driver, and has a manually-operated cupola with all-around vision blocks and a front block with a night channel. Six grenade launchers, three on each side, equip the vehicle. So does an automatic fire detection and suppression system, and an NBC Overpressure system. The arm can extend 8 meters and the bucket can lift 5 tons. The vehicle is otherwise similar to the PiPz-1, though updated in form and working methods, can lift 20 tons and has 100m of cable. The vehicle is equipped with a ½-meter-wide auger, a tow bar, internal welding tools, and a 10Kw generator. The driver's hatch is on the front left deck. The turret is replaced by a raised superstructure upon which are two hatches. An MG3 is located on a weapons mount next to the commander's hatch; another is next to the driver. A small laptop computer contains the tech manuals for the Dachs and for its equipment, as well as some engineering solutions.

The PiPz-2 is uses by Germany, Canada, and Chile. Canadian Dachs' have MEXAS composite appliqué armor applied for use in Afghanistan and Kosovo, as well as a floor plate. This is the PiPz-2A2

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
PiPz-1	$380,541	D, G, AvG, A	3 tons	40.8 tons	4	16	Passive IR (D)	Shielded
PiPz-2	$1,037,704	D, G, AvG, A	3 tons	43 tons	3	17	Passive IR (D), Image Intensification (C)	Shielded
PiPz-2A2	$1,063,767	D, G, AvG, A	3 tons	47 tons	3		Passive IR (D), Image Intensification (C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor
PiPz-1	157/110	39/28	1410	308	Stnd	T6	HF38 HS10 HR6
PiPz-2	149/104	37/25	1410	302	Stnd	T6	HF38 HS10 HR6

PiPz-2A2	140/98	35/25	1410	303	Stnd	T6	HF46Cp HS12Cp HR6**

Vehicle	Fire Control	Stabilization	Armament	Ammunition
PiPz-1/2	None	None	MG-3 (Bow), MG-3 (C)	4250x7.62mm
PiPz-2A2	None	None	MG-3 (C)	4250x7.62mm

*Gun hits are hits on the various cranes, winches, and tools on the vehicle. Ammunition hits are on the machinegun ammunition, the plastic explosive or engineer demo chests, or the mines. The GM will choose what it hit in such a case.
**Floor AV is 5Sp.

MaK BPz-2 Bergepanzer

Notes: This is an armored recovery vehicle based on the Leopard 1 chassis. About 700 BPz-2s have been built or modified from Leopard 1 tanks, and are or were used by Germany, Australia, Belgium, Canada, Netherlands, Italy (built under license by OTO Melera) Norway, Turkey, Turkey, and Greece. The BPz-2 replaced the M-48-based ARVs. The RFD was issued in 1961, and first deliveries took place in 1966.

The turret of the Leopard 1 is removed and replaced with a raised superstructure. The Bergepanzer is equipped with a crane on the front right side that can traverse 270º and lift 20 tons. The winch can tow a 70-ton vehicle with 90m of cable. The forward winch can pull 25 tons. The Bergepanzer is usually equipped with a wide variety of tools, spare parts, and has an integral fuel pump, 10Kw generator, and a dozer blade. The Bergepanzer has a driver's hatch on the front center deck, a commander's hatch on the front left deck, and two hatches on the left hull side. Passenger spaces are provided for an entire tank crew or additional repair personnel. The BPz-2 can carry an entire Leopard power pack on it's rear deck.

The BPz-2A2 is an upgraded form of the BPz-2. It has a jack carried on the rear face, a small hatch in the rear, a crane boom able to reach 7.68 meters, and can lift 32 tons, and it is strengthened. The jack is used to reduce the pressure on the dozer blade when working with the crane.The winch can pay out cable at 74 meters per second (as opposed to 22 meters per second). The BPZ-2A2 has double-vane pumps for the hydraulic system. It has mechanical dozer blade locking. The BPz-2A2 is sometimes called the Buffel, though it is not to be confused with the BPz-3..

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BPz-2	$357,818	D, G, AvG, A	4 tons	39.8 tons	4+4	16	Passive IR (D)	Shielded
BPz-2A2		D, G, AvG, A	4 tons	40.6 tons	4+4	14	Passive IR (D)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config*	Susp	Armor
BPz-2	159/112	40/38	1410	308	Stnd	T6	HF38 HS10 HR6
BPz-2A2	159/112	40/38	1410	308	Stnd	T6	HF38 HS10 HR6

Vehicle	Fire Control	Stabilization	Armament	Ammunition
BPz-2/2A2	None	None	MG-3 (Bow), MG-3 (C)	4250x7.62mm

*Gun hits are hits on the various cranes, winches, and tools on the vehicle. The GM will choose what it hit in such a case.

MaK M-47 BGs

Notes: As with the M-48 ARV (see below), this vehicle was originally produced by Germany for export and as kits for those retiring their M-47 main battle tanks. Another major seller of this vehicle was Spain, and the designs of the two countries are similar. The basic design is similar to the M-48 ARV, with the turret being replaced with a raised superstructure, crane, winch, fuel pump, and dozer blade. The M-47 ARV was used to recover both lighter tanks and armored vehicles and armored personnel carriers and infantry fighting vehicles. Slightly smaller than the M-48 ARV, it also is somewhat less capable than that vehicle in towing capacity. The crane is capable of lifting 18.7 tons at a reach of 5.3 meters, and unlike the M-48 ARV, can turn a full 360 degrees. The main winch of the M-47 ARV can pull 35 tons, or 70 tons with block and tackle. A secondary winch can pull 6.5 tons, or 13 tons with block and tackle. The dozer blade can excavate 190 cubic meters per hour, but is mainly used to brace the vehicle during heavy lifting or winching operations. The M-47 carries basic tools, wheeled vehicle tools, tracked vehicle tools, a welding and cutting set, an air compressor, small arms and heavy ordinance tools, a tow bar, several coils or rope and cable, and pulleys and snatch blocks for heavy winching operations. The M-47 ARV was developed for the Turkish, but has also been trialed in Pakistan.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$324,508	D, A	1.4 tons	44.9 tons	4	24	WL Spotlight (C)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
130/91	33/23	875	313	Stnd	T5	HF50 HS14 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	MG-3 (C) or MAG (C) or M-2HB (C)	2000x7.62mm or 1200x.50

MaK M-48 BGs

Notes: This is a recovery vehicle based on the chassis of the M-48A3 or A5 main battle tank. These vehicles were first produced by Germany for export and as kits to be sold to countries retiring their M-48 tanks; however, M-48 ARV began to be used in front-line service by many countries as damaged vehicles became more common. As such, they can be found in many of the countries that once used the M-48A3 or A5. In this role, the M-48 chassis has its turret removed, and a raised superstructure, along with a crane, winch, fuel pump, and dozer blade are added. The crane is mounted on the front right side and can lift 20 tons (enough for most tank turrets) at a reach of 6 meters. The winch has a pulling strength of 35 tons without bracing and 70 tons with bracing, and has 90 meters of cable. There is a secondary winch with a capacity of 6.5 tons, or 13 tons with bracing, and 100 meters of cable. The dozer blade can excavate 200 cubic meters per hour and is also used to brace the vehicle during heavy lifting or winching operations. The M-48 ARV is equipped with a welding and cutting set, an air compressor, tracked and wheeled vehicle tools, basic tools, small arms tools, heavy ordinance tools, a tow bar, several coils of rope and cable, and items such as pulleys and snatch blocks. These vehicles were built primarily for use by Germany herself, but The Turks have 4 and the Greeks have 3.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$433,511	D, A	1 ton	50.1 tons	4	24	Passive IR, WL Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
124/87	31/22	1420	218	Stnd	T6	HF51 HS16 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	MG-3 (C) or MAG (C) or M-2HB (C)	5000x7.62mm or 3000x.50

Dynamit Nobel Minewerfer (MiWS) Skorpion

Notes: This is the German Skorpion mine-laying system mounted on an M-548 load carrier chassis, as listed in the *American Combat Vehicle Handbook.* For most of its career, the Skorpion was used solely by Germany; however, Greece has recently bought some. In this role, the rear cargo area is totally taken up by the mine dispensers, six units of five box-shaped tubes. Each tube holds 20 antitank or antipersonnel mines, for a total of 600 mines, which are fused with a delay to allow friendly forces to get out of the new minefield safely. The pallets are discarded when empty and replaced with fresh pallets. A self-destruct may also be programmed, and minefield densities of 0.05 to 0.4 may laid. A typical field, 1500 meters by 50 meters, can be laid in five minutes, with the Skorpion traveling at 20 kmh. The Minefield is laid in two parallel strips, each 50 meters wide, on either side of the Skorpion. Mines are ejected obliquely to the rear of the vehicle, on either side. A typical vehicle can lay an antitank minefield with a density of 0.2, 1500x50 meters, in 5 minutes. At low densities, a minefield up to 3 kilometers long by 50 meters wide may be laid. Typical mine is an AT-2 antitank mine, a typical complete compliment of pallets weighs 4 tons.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$374,261	D, A	500 kg	12.4 tons	2	14	Headlights	Open

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
128/90	32/23/3	397	70	Stnd	T2	HF1 HS1 HR1

Fire Control	Stabilization	Armament	Ammunition
None	None	MG-3, EPEG Minelayer	1000x7.62N, 600xMines

Wiesel 2 Engineer Reconnaissance Vehicle

Notes: This is a Wiesel 2 APC fitted out for the engineer reconnaissance role. In this role, the Wiesel 2 carries a remote mine detector, an engineer demolitions chest, several kilograms of plastic explosive, mines, an optical chemical sniffer, a Geiger counter, and radiation shielding. Other equipment carried includes an inertial navigation set, GPS, a BMS system, a rubber raft for water inspections of bridges and suchlike, a computer to compile the results of their investigations with a wireless modem to upload it to higher headquarters, and at least two long-range. The engine is a turbocharged diesel which develops 110 horsepower and has an automatic transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$323,521	D, A	300 kg	7.25 tons	3	10	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
104/73	26/18	450	30	Stnd	T3	HF4 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	MG-3 (C)	750x7.62mm

Krauss-Maffei PSB-2

Notes: The PSB-2 (Panzerschenellbrucke 2) is based on the Leopard 2 chassis (new build versions of it). Currently, Germany and Netherlands will be its customers.

The hull is essentially unchanged from the Leopard 2 hull, with it's strong armor, automotive, and powerpack abilities, but the vehicle is greatly otherwise modified to serve the role of an AVLB. The bridge has center, front, and back sections, and can be laid and recovered from either direction. The bridge is deployed and recovered cantilever style, which cannot be seen from as great a distance as AVLB which employ V-employment. The vehicle can take a load of 70 tons has a matter of course; with care, vehicles of up to 100 tons can be accommodated. The bridge consists of aluminum modules, strengthened in strategic placed with steel. Two stabilizers must be lowered to the ground before deployment or recovery; in addition, there are stabilizers on both the front and rear of the center section. The bridge weighs 9.7 tons, takes 3 minutes to deploy, and five to recover.

Power is by an MTU MB-837 Ka-501 turbocharged diesel engine with an automatic transmission. The powerpack, automotive trains, and electrical and fuel systems are identical to the Leopard 2. The crew is protected by an NBC Overpressure system, an air conditioner and heater, and a small drinking water tank. Normal crew is two; however, the PSB-2 can carry an additional crewmember as a bridge deployment specialist. The driver is on the front left, the commander in the center, and the additional crewmember further back in the fuselage; he has vision blocks and a periscope, but no hatch. Ancillary equipment includes a number of cables, supports, blocks and tackles, ropes, etc.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,300,230	D, A	400 kg	55 tons	2+1	48	Passive IR (D, C, BC)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
191/134	48/34	1200	541	Stnd	T6	HF200Cp HS28Cp HR16

DRDO Armored Amphibious Dozer

Notes: This is the primary engineer vehicle of India. It is based on the BMP-2 chassis (which India calls the Sareth), and has its turret removed for this role. The vehicle has a large digging bucket with a capacity of 1.5 cubic meters, and a track-width dozer with a mine plow blade at the bottom, located at the front of the vehicle. The 8-ton capacity winch can be combined with a rocket anchor to throw a 100-meter cable to clear obstacles and for self-recovery; like most such setups, the rocket anchor may be winched back in, but the rocket module must be reloaded by hand, necessitating leaving the vehicle. The AAD carries six such rocket modules. The AAD also has a crane with a capacity of 3 tons. The AAD normally carries construction tools, excavating tools, a welding set, and an air compressor, as well as an engineer demo chest and 40 kilograms of plastic explosive. Most equipment, including crew equipment, is carried in the large amount of armored lockers and boxes on the sides of the AAD.

Power is provided by an Indian-built version of the Russian UTD-20/3 multifuel engine. It has a manual transmission. The driver is on the front left, while the commander is in the center of the vehicle in a manually-operated cupola with all-around vision and a night channel for his front vision block. The two doors on the rear face (and their fuel tanks) are retained, but the firing ports are deleted. Controls for the vehicle's winches, cranes, earth anchor, etc, are duplicated in the driver's compartment and the AAD can be operated by only the driver, if necessary.

Twilight 2000 Notes: This vehicle does not exist in the Twilight 2000 timeline.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$476,692	D, G, AvG, A	1 ton	17.2 tons	2	16	Passive IR (D), Image Intensification (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
135/95	34/24/4	460	106	Stnd	T2	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	2000x7.62mm

Avadi Vijayanta ARV

Notes: This is one of the standard armored recovery vehicles of India, made from retiring Vijayanta main battle tanks. In this role, the turret is replaced by a raised superstructure running along almost half of the vehicle's hull. At the front of this superstructure is an A-frame crane with a capacity of 10 tons, and the rear of the hull has a winch mounted with a capacity of 23 tons, or 70 tons with block and tackle. There is an auxiliary winch with a capacity of 3.75 tons. Both winches have 100 meters of cable. The usual assortment of tools for an ARV are issued with the vehicle, including welding and cutting gear, an air compressor, a fuel pump, a large set of tools (basic, wheeled vehicle, tracked vehicle, small arms, heavy ordinance), a tow bar, block and tackle, and various ropes, cables, and chains. The driver's position has been moved to the center of the front hull, the superstructure has two hatches for crew, and there is a flat area on the rear deck for a spare power pack.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$415,959	D, G, AvG, A	3 tons	34.2 tons	4	14	Passive IR, WL Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
128/89	32/22	1000	193	Stnd	T6	HF123 HS18 HR11

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG (C)	2600x7.62mm

CVRDE Kartik BLT

The Kartik is an AVLB based on the same lengthened Vijayanta chassis as the Catapult SPA. It uses a scissors-style of bridge based on that of the Polish/East German BLG-60's bridge. The bridge is deployed and recovered from the front of the vehicle. Deployed, the bridge is 20 meters long and is MLC-60 -- able to handle loads of about 60 tons. It is also one of the widest vehicular bridges, at 4 meters wide. It can therefore take two lanes of jeep-sized vehicles at once, or one tank-width vehicle and a lane of foot traffic, or a lane of vehicles up to 3 tons and a lane of vehicles that are BMP-sized. The bridge, however, is only 8 tons in weight and is made primarily of aluminum alloy, with steel bracing. The vehicle is powered by the same Leyland L-60 Diesel developing 535 horsepower, with a semiautomatic gearbox. Side armored boxes hold ammunition for the commander's gun and good-to-have equipment such as block and tackle, cable lengths, and rope, as well as basic tools and the crew's personal gear. The crew consists of a driver and a commander/bridge operator, and his machinegun is set on a low pintle mount which can remain mounted when the bridge is loaded, though it has a limited traverse of 60 degrees to the front.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$973,508	D, G, AvG, A	300 kg	42.2 tons	2	24	Passive IR (D), WL Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
113/79	28/20	1000	216	Stnd	T6	HF123 HS18 HR11

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG (C)	3000x7.62mm

AIFV AEV

Notes: This vehicle is designed to carry a combat engineer squad and their equipment into battle and to do their tasks. For the most part, the AIFV in this role looks like a given AIFV, but in this role, the AIFV has its turret removed. On the roof of the vehicle is a crane with a capacity of 3.09 tons, and the vehicle also has a winch with a capacity of 9.07 tons and 100 meters of cable. The AIFV AEV generally carries a case of plastic explosive, an engineer's demo chest, power tools, basic tools, excavating tools, an air compressor, a jackhammer, and welding and cutting tools. A 5 kW generator is provided on the rear deck to power these tools when the engine is off. This vehicle is used by Belgium and the Netherlands.

The driver is on the front left. The commander has a hatch on the center of the hull top with all-around vision blocks and a manual cupola with a weapon mount. The rest of the combat engineers sit in the same type of seats as on a standard AIFV, and the firing ports and rear door and ramp are retained. Power is a 267-horsepower turbocharged diesel engine, with a manual transmission.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$272,124	D, A	1 ton	14.1 tons	2+5	16	Active/Passive IR (D), WL/IR Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
141/98	39/27/4	416	92	Stnd	T2	HF6Sp HS4Sp HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

AIFV Recovery Vehicle

Notes: This recovery vehicle is based on the AIFV chassis (see *Twilight: 2000 Version 2.2* rules). The turret has been removed to make room for the crane. This crane has a lifting capacity of 1.36 tons, and is mounted on the rear left side. A winch is mounted in the rear of the vehicle that has 91.4 meters of cable and a capacity of 9.07 tons. The winch's mechanism makes sure the cable is always wound tightly and evenly around its drum. A spade is lowered on each side of the vehicle during heavy winching and crane operations. The AIFV RV has extra flotation devices in certain spots to make sure it floats evenly during amphibious operations. A large selections of spare parts are carried (mostly for light vehicles and smaller APCs), primarily for the vehicles of the country's that use it. A large selection of tools for vehicle repair are available, including basic, tracked vehicle, wheeled vehicle, power tools, and excavating tools. These are normally powered by a small 5 kW generator mounted on the rear right deck. The engine, transmission, and drive train, along with most of the automotive layout, are the same as the AIFV AEV. The driver and commander are in the same place, with the third mechanic inside the vehicle near the commander. The rear door and ramp remains, but the firing ports have been deleted.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$239,543	D, A	1 ton	13.75 tons	3	16	Active/Passive IR (D), WL/IR Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
149/104	41/29/4	416	97	Stnd	T2	HF6Sp HS4Sp HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

BLG-67

Notes: This joint venture between the former East Germany and Poland is their version of the Russian MTU-2. The Bulgarians also use this vehicle, as well as India and Iraq. The Germans no longer use it; they sold theirs off after the reunification.

The vehicle is based on the T-55 chassis, and on the whole looks very similar to the Czech MT-55A. The main differences are the plastic-covered bridging surface, the 20-meter maximum span of the bridge, its 50-ton capacity, and the two anti-current anchors carried by the vehicle. Each anchor is connected to the vehicle with 40 meters of cable, and they allow the BLG-67 to be used in a current of up to 0.5 meters per second. The bridges can be laid in series of up to 3 spans. The bridge takes 3 minutes to lay and 3-8 minutes to recover. It weighs 6 tons. The bridge is aluminum with a trackway covered with a tough plastic, ribbed trackway that protects it against the elements and wear from vehicles, as it is easily replaced.

The M2 version is designed to carry the standard bridge or a three-span bridge 30 meters long and 3.47 meters wide (wider than your average AVLB). The bridge is 8 tons. The stats for the M2 version below is with the longer bridge.

The driver is on the front left, while the commander/bridge operator is opposite the driver, sitting about a foot higher; the BLG-67 may also carry a dedicated bridge operator/spotter, but this is not required. The situation of the commander's cupola does not allow for the mounting of a weapon or a pintle mount.

The Swedish bought 32 from Germany in 2010, but as of 2012 only 12 remained in service, as they used some vehicles to fix

and upgrade the others, essentially returning them to a zero-miles condition. (With the replacement of their Brobv 941s by the "new" Brobv 971s, these 12 AVLBs are now the only AVLBs in the Swedish military.) The Brobv 971s have been modernized, especially in the area of the bridge, which makes the MLC-60 class bridge into an MLC-70 class. They use only the two-span bridge.

Power is provided by a 581-horsepower V-55 diesel engine with a manual transmission. The BLG-67 series cannot use auxiliary fuel tanks, as the bridge operation prevents this.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BLG-67	$934,554	D, A	500 kg	37 tons	2+1	30	Headlights	Shielded
BLG-67 M2	$1,037,668	D, A	500 kg	36 tons	2+1	30	Headlights	Shielded
Brobv 971	$1,285,314	D, A	500 kg	38 tons	2+1	30	Image Intensification (D)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
BLG-67	130/91	36/25	680	215	CiH	T6	TF4 TS4 TR4 HF60 HS12 HR6
BLG-67 M2	133/93	37/26	680	215	CiH	T6	TF4 TS4 TR4 HF60 HS12 HR6
Brobv 971	128/89	36/25	680	215	CiH	T6	TF4 TS4 TR4 HF60 HS12 HR6

Puma Armored Engineer Carrier

Notes: This is an armored personnel carrier based on the Sho't (a version of the Centurion) chassis. It is used by Israel, and is designed to operate with Merkava tanks. The Puma saw early controversy when it was used against Palestinian fighters; the British government at first objected because the Puma has a high degree of Centurion (and therefore British-made) components; citing a breach of agreement. They have since dropped their official objections.

The turret has been removed and replaced with hatches, a commander's position with machinegun, and three other machineguns, one to each side of the crew compartment and one forward of the crew compartment. A new power pack, with an AVDS-1790-6A engine developing 900 horsepower has been added. The suspension is a Modified Horstman suspension, and the transmission is automatic. The Puma also carries a winch with a capacity of 25 tons (50 tons with block and tackle) and 100 meters of cable. The Puma carries excavating and pioneer tools.

The gunner's armament is a MAG machinegun in a Rafael OWS; the gunner can aim, fire, and reload the gun while under armor. The other three machineguns are on simple pintle mounts. In addition, the Puma is armed with a Soltam C-08 60mm mortar firing over the rear; this is meant primarily for firing covering smoke or HE rounds into minefields, but can be used offensively as well. The Puma also is armed with two obliquely forward-firing TAAS 80mm IS-6 Smoke Grenade Launchers. There 10 rockets for these dischargers. The crew are also armed with standard small arms, and all but the driver can deploy if necessary. Additional mine/IED protection comes in the form of an electromagnetic mine/IED neutralization system that jams radio frequency detonators, cell phones, and wired devices. The Puma should roll a d20 when encountering a mine or IED within 10 meters; a roll of 12 or greater jams the mine or IED permanently. An engineer demolitions chest and 40 kilograms of C4 are also carried, as well as 10 thermite grenades. It is equipped with an Israeli BMS.

The Puma can be equipped with the Carpet MICLIC system. This consists of 20 FAE rockets mounted on the rear deck of the Puma, firing forward (it may also be on a trailer towed by the Puma or other vehicle). When the fuel-air explosive bursts, it creates overpressure that destroys most mines under it. Between one and the full complement of 20 rockets may be fired at once.

The Puma has air conditioning, and a vehicular NBC pack. Appliqué armor has been added, and ERA lugs are provided on the HF and HS, and the Puma has essentially a new armor suite. The armor is modular and damaged armor can be easily replaced, or even replaced with more advanced armor if it comes available. The normal crew consists of a driver, gunner, and commander, and a 5-man sapper team. The commander has a manually-rotating cupola with all-around vision blocks; one has a night vision channel, and cameras on the RWS allow the commander to monitor the exterior situation using an LCD screen. There is a 90-liter drinking water tank inside the Puma.

The Puma often uses mine plows or rollers or tows mine-planting equipment, and has a winch. A mine plow is in fact ubiquitous, equipping nearly all Pumas. Mine rollers, rakes, or flails can be mounted instead of the plow.

An urban warfare variant of the Puma has a large superstructure ringed with firing ports for small arms and machineguns, and hatches atop the superstructure. The gunner's position remains, with it's MAG-armed OWS. as on the standard Puma. The three other machineguns are removed from the sides and rear, as the hatchway is no longer there, replaced by nine firing ports with large windows of bullet-resistant glass/vinyl/Plexiglas mix, which is as strong as the rest of the superstructure's armor. Nine troops can be jammed in there, though six is a more common complement. The roof cupolas may be armed with pintle-mounted machineguns; this is reflected in the stats below. This version has a beefed-Up suspension to drive over rubble.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Shielded
Puma AEC	$1,692,112	D, A	2 tons	51 tons	3+5	25	Passive IR (D), Image Intensification (C. G), Thermal Imaging (G)	Shielded
Puma w/Superstructure	$2,368,957	D, A	1.5 tons	53 tons	3+9	25	Passive IR (D), Image Intensification (C. G), Thermal Imaging (G)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
Puma AEC	125/88	35/24	1037	321	Stnd	T6	HF100Cp HS24Sp HR20
Puma w/Superstructure	120/84	35/24	1037	334	Trtd	T6	TF40 TS40 TR40 HF100Cp HS24Sp HR20

Vehicle	Fire Control	Stabilization	Armament	Ammunition
Puma AEC	+2	Fair	MAG (x3), MAG (G), 60mm C-08 Mortar, 2x80mm IS-6 Smoke Grenade Launchers	6000x7.62mm, 60x60mm, 10x80mm
Puma w/Superstructure	+2	Fair	MAG (x2), MAG (G), 60mm C-08 Mortar, 2x80mm IS-6 Smoke Grenade Launchers	10000x7.62mm, 60x60mm, 10x80mm

Puma RAM

Notes: One of the few vehicles of its kind in the world, the Puma RAM is based on the Puma AEC and is a heavy armored recovery vehicle. It's primary job is to service and recover vehicles like the Puma AEC and the Nagmasho't HIFV, though it is

capable of working with even Merkava tanks. The Puma RAM is a basic vehicle designed to have the protection to make it up to the front lines and rescue damaged vehicles.

The heavy crane arches over the vehicle, able to turn nearly 300 degrees and take a powerpack off of it's roof and putting it into a vehicle, or vice versa. Powerpacks are carried on the rear deck of the vehicle shaped like a huge basket. The crane can lift 25 tons, and the main winch can pull 50 tons, or 90 tons with block and tackle. An auxiliary winch, normally used as a lead winch, can pull 13 tons, or 26 tons with block and tackle. Numerous boxes and stowage bins carry basic, tracked vehicle, wheeled vehicle, power, and excavating tools, and welding and pneumatic tools. They also carry a large amount of spare parts, ropes, and cables. The RAM has one machinegun at the commander's hatch on a pintle mount, and 10 smoke grenade dischargers.

The commander is in the front right, and the driver on the front left. One other hatch is on the center left deck and is used by the crane operator, as the crane is on the left rear corner. Stabilizers in the rear corners and a dozer blade are used to brace the vehicle when using the crane. The commander has a night channel on the front vision block of his manually-rotating cupola, and the driver has a night channel on his front block. The vehicle has air conditioning, a 30-liter drinking water tank, and a laptop computer to help the crew out with technical information. Engine and suspension are the same as on the parent Puma AEC. It is equipped with a BMS.

Normally, the vehicle carries four mechanics (including the commander and driver, and has seats for the crew of a rescued tank.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Shielded
$1,436,735	D, A	5 tons	44 tons	2+6	25	Passive IR (D), Image Intensification (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
129/91	36/25	1037	329	Stnd	T6	HF100Cp HS24Sp HR20

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG (C)	2000x7.62mm

Trail Blazer ACERV

Notes: The Trail Blazer is an Israeli combat engineer vehicle that doubles as a recovery vehicle. The Trail Blazer is the English name; the Israeli name is Gordon. These vehicles are converted largely from M-4A1 Shermans, with a new engine and transmission. It is an elderly design still relevant when recovering lighter vehicles and performing some less-demanding combat engineer tasks.

In this role, the turret is replaced with a raised superstructure; to the right of this superstructure is a crane of the same type mounted on the AMX-30D ARV. This crane may swivel 240 degrees, and may lift 12 tons through 240 degrees, of 15 tons when positioned straight out to the side and if it does not have to turn. At the front of the vehicle is a winch that has a capacity of 35 tons, or 70 tons with block and tackle, with 100 meters of cable; at the rear of the vehicle is an auxiliary winch with a capacity of 3.5 tons, or 7 tons with block and tackle, and 120 meters of cable. At the front of the vehicle is a large blade used to clear obstacles, while at the rear is a smaller one normally used to brace the Trail Blazer while it uses its winches or crane. There are also stabilizers at the rear of the vehicle, and they can also be used to lift loads up to the roof. Power is provided by a diesel designed for the vehicle developing 460 horsepower, but with a manual transmission.

As a combination recovery and combat engineer vehicle, it carries a wide variety of tools depending on its role; for combat engineer mode, it normally carries basic, excavating, construction, and power tools, welding and cutting gear, an engineer demolitions chest, and an air compressor; in the recovery vehicle role, it normally carries basic, wheeled vehicle, tracked vehicle, small arms, and heavy ordinance tools, an air compressor, and excavating tools, as well as a tow bar. In both roles, the Trail Blazer normally carries several lengths of rope, cable, and chains. It also carries wire and shackle/rebar cutters of various sizes, a welding set, two mine detectors, an engineer demo chest, and 20 kilograms of C4. Other equipment includes an optical chemical sniffer and 40 flags for marking contaminated area. The vehicle is festooned with external boxes, bins, and lockers for equipment, both engineer and repair and personal gear. A small laptop contains technical information about engineer tasks as well as repair tasks.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$525,189	G, A	1 ton	33.2 tons	4	17	WL Spotlight (C)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
81/57	22/16	636	256	Stnd	T5	HF27 HS8 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

Otobreda OF-40 ARV

Notes: Like most vehicles of its type, the OF-40 ARV uses the chassis of the base OF-40 Mk 2 tank, with the turret removed and a raised superstructure, crane, winch, and tools in its place. A dozer blade is at the front. The crane has a capacity of 18 tons, and can be manually operated if necessary. The main winch has a pulling capacity of 36 tons, or 72 tons with block and tackle, and has 80 meters of cable. The vehicle carries all the necessary tools for repair and recovery of vehicles up to main battle tanks, including basic, tracked vehicle, wheeled vehicle, small arms, and heavy ordinance tools, a welding and cutting set, an air compressor, a tow bar, and ropes and cables.

The engine is the same as on the OF-40 Mk 2 tank: an MTU MB 838 ca M 500 830-horsepower multifuel engine.

The OF-40 ARV was designed specifically for export. The UAE bought 18 to support their force of 40 OF-40 Mk 2 tanks; the Libyans, despite the fact they bought a good number of OF-40 tanks, decided to buy ex-Soviet ARVs instead of matching OF-40 ARVs. No other sales have been made; I have been unable to determine whether the OF-40 series are still on the market.

Twilight 2000 Notes: As with the OF-40 main battle tank, this Italian recovery vehicle had pre-war sales only to the United Arab Emirates, even though it was specifically designed for export. As with the OF-40, the Italian government requested all some stocks on Italian soil and manufacturing capability to be directed to Italian use, and these vehicles were taken into Italian Army service to replace vehicle losses, and sales during the Twilight War were made to Thailand and Greece.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$640,149	D, G, A	2 tons	45 tons	4	15	Image Intensification (D, C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
142/100	40/28	1000	298	Stnd	T6	HF72 HS18 HR14

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG (C)	2800x7.62mm

Mitsubishi Type 67 AVLB

Notes: This is a Japanese armored vehicle-launched bridge mounted on a Type 61 main battle tank chassis. Like the rest of Japan's military designs, the Type 67 was not export and production was limited to 16 vehicles. The Type 67 has almost totally phased out of service, as the newer Japanese fighting vehicles and tanks can barely be supported by the Type 67's bridge or not at all.

The bridge is short, 12 meters long and able to span a gap of 10 meters, with a maximum load of 40 tons. The bridge may be laid in 3 minutes and recovered in 5 minutes; it may be laid over the front of the Type 67, but may be picked up and restowed from either end of the vehicle.. The driver is in the front right of the hull, with the other two crewmembers in the center. The commander is forward in the hull, while the bridgelayer crewmember is more towards the center of the vehicle. The commander's machinegun can be mounted while carring the bridge, but with the bridge present, shots to the front of the Type 67 are all but impossible.

The hull is for the most part identical to the hull of its parent Type 61 tank, with Mitsubishi Type 12 HM 21 WT diesel engine developing 650 horsepower. The transmission is manual.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$483,128	D, A	300 kg	35 tons	3	24	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
146/103	41/28	875	193	CiH	T6	TF4 TS4 TR4 HF51 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	Type 67 (C)	2000x7.62mm

Mitsubishi Type 67 AEV

Notes: The accent on the Type 67's abilities is the removal and clearance of battlefield obstructions. Though Komatsu offered an AEV based on the then-retiring M-4 Sherman, the JGSDF held off until it was presented with a better vehicle. The Type 67 has a front-mounted mine plow/dozer blade with an AV of 8 and is controlled by the driver. Hull layout is roughly the same as the Type 70, also like the Type 70, the Type 67 has an A-frame crane with a capacity of 18 tons. It also uses the same winches as the Type 70 below. It carries a plethora of tools for obstacle removing, including a full set of power tools and hydraulic tools, along with various ropes, cable, hooks, and even a tow bar.. The Type 67 carries 20 kilograms of plastic explosive and the equivalent of an engineer demo chest.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$550,261	D, A	600 kg	35 tons	4	22	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
144/101	40/28	875	189	Stnd	T6	HF51 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	Type 67 (C)	2000x7.62mm

Mitsubishi Type 70 ARV

Notes: This Japanese recovery vehicle is based on the chassis of the Type 61 main battle tank, and even more so than the Type 67 AVLB, has been phased out of Japanese service. As with other Japanese military equipment, it is prohibited by Japan's constitution to sell it abroad, and the phased-out Type 70s have been scrapped, used as range targets, or ended up in museums.

As with most such vehicles, the turret of the Type 61 has been replaced with a raised superstructure.; there is also an area on the flat rear deck which may carry the powerpack of the Type 61 or smaller vehicles. Atop the superstructure is an A-frame crane with a capacity of 18 tons. The Type 70 has a main winch with a capacity 35 tons, or 70 tons with block and tackle, and with 60 meters of cable. An auxiliary winch has a capacity of 3 tons, or 6 tons with block and tackle. The tool kit on the Type 70 includes a tow bar, basic, tracked vehicle, heavy ordinance, and excavating tools, and an arc welder. Inside, there is storage for tech manuals of various sorts of Japanese vehicles. Generally when replacing a powerpack or lifting a large load, a dozer blade at the front is lowered to increase stability.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$672,925	D, A	4.6 tons	35 tons	4	18	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
144/101	40/28	875	189	Stnd	T6	HF51 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition

None	None	81mm Mortar, M-2HB (C)	27x81mm, 600x.50

Komatsu Type 75 ACE

Notes: This is a Japanese Armored Combat Earthmover (ACE) that entered service in 1975. The dozer blade is to the rear, and the vehicle is driven backwards for earthmoving operations, the driver sighting through a vision block to his rear and left.. The crew enters through a door on the right side of the hull or by two hatches on the roof of the crew compartment in front. The driver is on the left, and the commander on the right. The commander can also step up on a platform in the cab, guiding his driver through an intercom link. The engine is at the rear of the vehicle. The engine is a Mitsubishi diesel developing 345 horsepower. It is capable of working at a fuel-saving 160 horsepower, high-torque mode, normally when working with the dozer blade. The Type 75 also has a winch with a capacity of 35 tons, or 70 tons with block and tackle; note, however, that block and tackle equipment is not normally carried by the Type 75. However, three sets of pioneer tools are carried, as well as a power saw and chainsaw; there are numerous lockers and bins for more equipment. The Type 75 is not normally armed, and no provision for a weapon is provided.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$355,074	D, A	1.5 tons	19.2 tons	2	17	Headlights	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
138/97	38/27	595	98	Stnd	T3	HF4 HS4 HR4

Mitsubishi Type 78 ARV

Notes: This is an Armored Recovery Vehicle based on the Type 74 main battle tank chassis. It is more up-to-date than the Type 67 ARV. That said, the Type 78, has much the same equipment as the Type 67, if in an updated form. In place of a turret, the Type 78 has a raised superstructure with a crane on the right able to lift 20 tons. The Type 78 has a winch with capacity of 38 tons (or 76 tons with block and tackle). and 60 meters of cable. The winch has high-speed and low-speed modes. An auxiliary winch has capacity of 3.26 tons. or 6.52 tons with block and tackle; it is normally used as a lead winch for the main winch. The vehicle carries a wide variety of recovery and repair tools, including a tow bar, basic, tracked vehicle, heavy ordinance, and excavating tools, an arc welder, and an air compressor; a selection of spare parts is also caried, and items such as transmission fluid and lubrication oils and grease. There is a dozer blade at the front of the vehicle for bracing and earthmoving; in addition the suspension can be locked to further brace the vehicle.

The Type 78 is powered by a Mitsubishi 10 ZF 720-horsepower turbocharged diesel, with an automatic transmission. three smoke grenade launchers can be found at the front of the superstructure on either side. The commander is armed with a heavy machinegun, though only a limited supply of ammunition is carried as basic load and the weapon; as on virtually all such vehicles, is defensive in nature.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$441,045	D, A	5 tons	38 tons	4	15	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
146/103	41/28	950	262	Stnd	T6	HF56 HS14 HR10

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	660x.50

Mitsubishi Type 90 ARV

Notes: This is a Japanese recovery vehicle based on the chassis of the Type 90 tank; and designed specifically to service the Type 90 tank and other vehicles. It was designed specifically to support the Type 90 tank. Instead of a turret, the Type 90 ARV has a raised superstructure and a crane on the right side with a capacity of 25 tons. It also has a winch with a capacity of 55 tons (110 tons with block and tackle), and 80 meters of cable. On the front of the vehicle is a dozer blade that is used to stabilize the vehicle during recovery operations and to clear obstacles and prepare fighting positions; The Type 90 ARV carries a wide variety of tools, including basic, tracked vehicle, heavy ordinance, and excavating tools, and an arc welder and air compressor. A tow bar and a selection of spare parts for the Type 90 and a few other commonly-recovered vehicles is also carried. The driver sits on the front left with the commander and two other crewmembers behind him in the superstructure. The hull layout of hatches, bins, and lockers are much the same as the Type 67

Commander's and driver's positions are in the front of the nearly-vertical front of the vehicle. At the rear if a larger hatch for the recovery specialist can use the crane and enter and exit. When traveling, the crane is folded along the right side of the superstructure; the superstructure is shifted to the left side to allow this. The commander has a cupola above his position, manually-operated and with a pintle-mounted heavy machinegun. The Type 90 has five-cell smoke grenade launchers at the top of the forward superstructure. This gun may aimed and fired from inside the vehicle with hatches closed. The interior has the ability to recover the Type 90 tank or any similar or lighter vehicle; four seats inside are for the recovered vehicle's crew. The T-90 ARV is equipped with the same engine as the Type 90 tank: Mitsubishi 10ZG turbocharged diesel developing 1500 horsepower, coupled

to an automatic transmission; the Type 90 can lock it's suspension as well as pivot turn in place. The Type 90 ARV is connected to an BMS and has a small computer that carries tech manuals for all Japanese vehicles as well as the BMS software. Two LCD screens allow the crew to monitor the BMS information; the driver has an LCD screen to monitor the vehicle's health, and the commander has a duplicate of the BMS screens. Conventional maps are also carried, as well as typed notes that summarize recovery information. Though the Japanese have only 14 built by this date, their speed allows it to supply quick assistance.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$569,463	D, A	7.59 tons	49.57 tons	4+4	30	Passive IR (D), Image Intensification (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
209/146	58/41	1100	547	Stnd	T6	HF100 HS24 HR12

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1500x.50

Chenca

Notes: This Mexican version of the M-32B1 Sherman-based Tank Recovery Vehicle differs from chiefly in the engine used and the abilities of its recovery and engineering equipment. The final drives have brackets added to allow mounting of a dozer blade, and the engine is an earlier version of that mounted on the Stingray tank. The Chenca is designed for use by both recovery and combat engineer vehicle, with a wide variety of tools and weapons for this purpose. Primary recovery equipment is a winch in the front hull with a capacity of 27 tons, or double that if block and tackle is used; the cable is lead out of the glacis plate, and the reel is located behind the driver's seat. There is also an A-frame crane with a capacity of 9 tons, or 14 tons if the vehicle is stationary and the bogies locked. The turret is replaced with a circular superstructure. A large amount of tools are carried containing almost anything a recovery mechanic or combat engineer could need, including basic, tracked vehicle, wheeled vehicle, excavating, power, small arms, and heavy ordinance tools; a jackhammer, a chainsaw, an air compressor, up to 6 fire extinguishers, and a combat engineer's chest.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$202,068	D, G, AvG, A	1.5 tons	29.2 tons	4+2	12	Active/Passive IR	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
121/85	25/20	651	193	Stnd	T5	HF27 HS8 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C), MG-3 (Bow), M-29 81mm Mortar (FH)	300x.50, 2000x7.62mm, 30x81mm, 50 kg Plastic Explosive

Obrum MID Bizon CEV

Notes: The MID is a Polish combat engineer vehicle based upon the PT-91 chassis, and incorporating many features of the WZT-3 armored recovery vehicle below. Its main characteristic is the heavy jib crane on the right side of the roof; this crane arm can be equipped with a gripper claw for removal of battlefield obstacles, or a digger bucker. The crane has a capacity on 7 tons, and can extend a maximum of 7.94 meters away from the vehicle. The crane arm may rotate 180 degrees, covering the right side of the vehicle; it also has a depression of -55 degrees up to +60 degrees. On the front of the vehicle is a V-shaped dozer blade with a width of 4.2 meters; this is primarily a mine removal tool, moving the mine outside of the MID's track, but also can be equipped with a lower ripper claw to destroy road surfaces. When used at a mine plow, it has an AV or 8. The bucket may also be equipped with a ripper claw, and this is more likely to be mounted. The ripper claw may be extended 5.94 meters; the blade can dig out a 1-meter square and digger bucket can lift 0.96 meters square if it can grab on a vehicle that is large enough can lift up to 3.3 tons and pull, for example, a vehicle from the roadway. The MID has a primary winch with a capacity of 45 tons, and a secondary winch with a capacity of 4.5 tons with 400 meters of cable. The MID also carries integral welding gear. If necessary, the MID can be equipped with a deep wading system that allows fording to a depth of 5 meters for up to 1000 meters. Normal wading depth is 1.2 meters. Finally, the M.I.D. is equipped with a smoke generation system that produces smoke that is opaque to IR detection systems (such as passive or active IR, or starlight scopes), as well as obscuring normal optical devices. Other equipment includes basic and tracked vehicle tools, 2 sets of pioneer tools, a chainsaw, and a 5kW generator with a voltage converter, and can be used to recharge the batteries or take their place if they are drained. The RPK and RPG-7 come with the vehicle, but are not actually mounted; 50 kg of plastic explosive and an engineer demo chest are carried to reduce stubborn explosive obstructions. The RPG-7 is normally armed with FAE warheads for the rocket launcher, A secondary role for the MID is for the repair of buildings and field fortifications and roads, as well as their destruction. In addition to its normal armament, the MID has an NSVT, and a RPK on the right hull and an PKT on the left side near the center in both cases, near the fender, and both have limited traverse and elevation, and may fired directly or by a remote uplink from the commander's or gunner's position. The seats are directly behind the driver, and gunner's seats. Four seats may carry up to four other engineers, It has well as four smoke grenade launchers on each fender. It normally carries two bundles of 40 meter long trackway.

Aside from Poland, the MID is used by the Malaysian Army, based on its version of the PT-91, called the PT-91M. This is the MID-M.

Twilight 2000 Notes: The MID was barely into production at the outset of the Twilight War, and perhaps fewer than 30 of these vehicles were built.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,233,134	D, G, AvG, A	1 ton	46 tons	2+4	27	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
132/92	37/26	1000	272	Stnd	T6	HF130 HS20 HR12

Fire Control	Stabilization	Armament	Ammunition
None	None	NSV (C), RPK, RPK-74K, RPG-7	300x12.7mm, 1000x5.45,1000x7.62mm, 7xRPG-7 Rockets

HSW MT-LB Armored Engineer Reconnaissance Vehicle

Notes: This Polish adaptation of the MT-LB is intended for reconnaissance of bridges, road conditions, structures, potential demolitions and trap sites, and possible fortification sites. In this role, the MT-LB is fitted with a variety of standard and video cameras, an optical chemical sniffer, a Geiger counter, and specialized equipment for determining the state of repair and strength of roads and bridges, as well as open ground, ice, snow, river banks and bottoms, and beaches. Water depth can also be measured. A characteristic of the MT-LB Armored Engineer Reconnaissance Vehicle is the large rail type antenna centered over the right side of the vehicle, for the 5 long-range radios. The NSV machinegun is in a small cupola, and may be aimed and fired from within the vehicle. The RPG-7s come with the vehicle, but are not mounted; the vehicle normally carries FAE warheads for its RPG, in order to reduce obstacles. 20 kilograms of plastic explosive and an engineer demolitions chest are carried for the same purpose. The crew's findings are radioed to higher headquarters via a high-gain antenna, and the radios can transmit digital, radio, and teletype information. It is not equipped for NBC purposes, and has no such detectors, though the front hull does have a mine detector in it. The crew consists of a driver and commander, as well as 1-6 additional engineers as necessary to operate the reconnaissance equipment.

Power is provided by SW680/167/1 turbocharged diesel developing 245 horsepower.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$339,018	D, A	1.7 tons	13.15 tons	2+6	33	Passive/Active IR (D, C), Image Intensification (D, C, Cameras)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
134/94	37/26/2	450	80	Stnd	T3	HF5 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C), 6xRPG-7	240x12.7mm, 36xRPG-7 rockets

Obrum WZT-3 ARV

Notes: This Polish armored engineer vehicle is based on the T-72M MBT chassis, and is similar in appearance to the Russian BREM-1 ARV. It was designed in the late 1980s, and is the last (so far) in a long line of Polish ARVs that started after World War 2. It has several differences from the BREM-1, however, to suit Polish needs. It was designed to support the T-72 and smaller vehicles, as well as some vehicles still on the drawing board or experimental phase at the time. In addition to Poland, Bulgaria uses the WZT-3, as does Malaysia. The WZT-3 was built only from 1988 to 1989, and only 20 were built.

As with the BREM-1, the turret of the T-72 is replaced with a raised superstructure. The driver sits in the front left of the superstructure, with the commander in a cupola to the driver's right. Two mechanics sit in the hull, behind the driver and commander's positions, and facing to the rear. There is a hatch on the front of the roof for them to enter and exit, but it has no vision blocks. Behind the superstructure on the deck is a platform for power packs and other major components. Just behind the driver is the crane, which has a reach of 5.8 meters and can lift 13.5 tons at that reach; if extended 5.8 meters or less, it can lift 15 tons. At the front of the vehicle is a large dozer blade for excavating or bracing purposes. The main winch is driven by the engine and has a capacity of 65.3 tons, or 83.5 tons when block and tackle is used; this winch has 200 meters of cable. The auxiliary winch has its own motor, has 400 meters of cable, and a capacity of 2.04 tons, but is not designed to be used with block and tackle. Specialized equipment carried include two tow bars, tow cables, electrical and gas welding gear, impact wrenches, basic and vehicle tools, electrical and electronic tools, and a chain saw. A 6kW APU is provided to power the tools and the winches. The WZT-3 also has a fuel pump to provide fuel from another source to itself or other vehicles.

The engine of the WZT-3 is the V-46-6 turbocharged diesel, with an output of 780 horsepower. This and the high torque allows the WZT-3 able to tow 50 tons at half speed, or 75 tons at one-quarter speed.

The WZT-3M

When the Polish brought the PT-91 Twardy into service, it was felt that the combination of the heavier Twardy and the advent of new technologies meant that the WZT-3 would have to be upgraded. The primary differences were the basing of the armor suite on the Twardy (the WZT-3M is based on the PT-91, instead of the stock T-72); and the use of the Twardy's S-12U turbocharged diesel, developing 850 horsepower, though it also has a gun at the commander's position that may be aimed and fired from within the vehicle. 9 new WZT-3Ms were built for Poland and Bulgaria, and all other WZT-3s were upgraded to the WZT-3M standard. India went all out and bought 352 WZT-3Ms; they have another 204 on order. These 204 will be supplied in kits, to be assembled in India.

The Malaysians call their version of the WZT-3M the WZT-4.

Kuwait operates 15 ARVs which are functionally equivalent to the WZT-3, but is based on the Serbian M-84AB tank. Their stats are somewhat different, but the results are similar. These are designated by the Kuwaiti military the M-84ABI. They continue to be powered by the V-46TK engine, developing 780 horsepower.

Polish WZT-3Ms are equipped with a BMS, allowing them to interact with higher headquarters and receive orders. It also carries computers dedicated to the BMS and interfacing with maps and the GPS, as well as one to provide technical information on virtually any Polish vehicle. Indian models also have a BMS and GPS, as well as inertial navigation backup.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
WZT-3	$612,493	D, A	2.5 tons	42 tons	4	30	Active/Passive IR (D)	Shielded
WZT-3M	$626,309	D, A	2.5 tons	43 tons	4	32	Passive IR (D), Image Intensification (C)	Shielded
WZT-3M (Polish/Indian)	$1,049,189	D, A	2.5 tons	43 tons	4	34	Passive IR (D), Image Intensification (C)	Shielded
M-84ABI	$658,768	D, A	2.5 tons	43 tons	4	32	Passive IR (D), Image Intensification (C), WL/IR Spotlight (C)	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
WZT-3	145/101	40/28	1126+400	285	Stnd	T6	HF149 HS20 HR10
WZT-3M	152/105	42/29	1126+400	311	Stnd	T6	HF149 HS20 HR10
M-84ABI	142/100	40/28	1050+400	284	Stnd	T6	HF158 HS15 HR12

Vehicle	Fire Control	Stabilization	Armament	Ammunition

WZT-3/3M/M-84ABI	None	None	NSV (C)	500x12.7mm

BAT-2

Notes: The BAT-2 is a combat engineer vehicle used by Russian and Pact forces. The vehicle is based on a T-64 chassis, and has a large V-shaped dozer blade mounted at the front. The BAT-2 has a crane with a capacity of 2 tons that may reach out 7.3 meters from the vehicle, and may be fitted with pincer-type tools. Mounted on the same platform as the crane is a 25-ton capacity winch with 100 meters of cable.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$151,719	D, G, AvG, A	6 tons	39.7 tons	2+8	21	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
117/82	25/20	1000	252	Stnd	T6	HF8 HS3 HR3

BREM-1 ARRV

Notes: An ARRV (Armored Repair and Recovery Vehicle) based on the T-72. The turret is replaced and a crane is mounted on the left side that can reach over the entire vehicle and lift 19 tons. The main winch can tow 25 tons, or 100 tons with special equipment and preparation (carried, but not normally fitted). The auxiliary winch can pull 12 tons, the vehicle has a dozer blade, and electric tools, winch gear, standard tools, and a 5Kw generator are standard gear.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$131,256	D, A	4 tons	41 tons	4	16	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
139/97	30/20	1000+400	311	Stnd	T6	HF120 HS18 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C)	300x12.7mm

BREM-2

Notes: This is a recovery vehicle based on the BMP-1, in the same way that the BREM-1 is based on the T-72. It is intended for recovery and repair of the BMP-series of infantry fighting vehicles. The turret of the BMP-1 is replaced with an armored plate, and the upper hull mounts a crane with a capacity of 1.5 tons. Various recovery tools are placed in stowage positions at various locations on the hull roof and sides, including a tow bar, 200 meters of rope, basic, tracked vehicle, small arms, and heavy ordinance tools, and excavating tools. The front of the vehicle has a large dozer blade which is used to brace the BREM-2 in recovery operations and when using the crane. There is also a carrying position on the left rear roof for a BMP-series power pack. The interior of the vehicle houses a 6.5-ton capacity winch. Russia and other Pact forces use the BREM-2.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$85.723	D, A	1.5 tons	13.6 tons	4	8	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
147/103	30/20/3	460	111	Stnd	T3	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	2000x7.62mm

BREM-64

Notes: As Russia began to retire its T-64 tanks, some of these vehicles were converted into recovery vehicles for other main battle tanks. These vehicles are known as the BREM-64. In this vehicle, the turret is removed and replaced with an armored superstructure with a cupola for the commander; this cupola mounts an NSVT heavy machinegun. The BREM-64 is equipped with a crane that may lift 2.5 tons (the approximate weight of a Russian tank's power pack). The BREM-64's main winch has a pulling strength of 25 tons, while the secondary winch has a strength of 2.5 tons. The vehicle has a full-width dozer blade mounted at the front, which may brace it during lifting and winching operations, or prepare combat positions. In addition to the standard diesel engine of the T-64, the BREM-64 has an auxiliary power unit of 60 kW, to power vehicle tools without wasting engine fuel. The BREM-64 is equipped with basic tools, tracked vehicle tools, small arms and heavy ordinance tools, a welding unit, an air compressor, and excavating tools.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$112,501	D, A	2.5 tons	40.5 tons	3	15	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
121/85	25/20	1000	259	Stnd	T6	HF64 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C)	500x12.7mm

BREM-80U

Notes: With BREM-64s proving inadequate to the task of recovering the heavier T-80 and T-90 tanks, and the BREM-64's crane and winching capacity generally not good for the recovery of heavy vehicles anyway, a much improved recovery vehicle based on the T-80 tank chassis was designed in the late 1980s. It is generally similar in layout to the BREM-64, but is greatly improved. The crane on the BREM-80 has a capacity of 18 tons, or 30 tons with block and tackle. The main winch has 120 meters of cable and has a capacity of 35 tons, or 140 tons with block and tackle. The secondary winch has a capacity of 1 ton and has 320 meters of cable. The BREM-80 has a full too set, including basic, wheeled vehicle, tracked vehicle, small arms, heavy ordinance, and excavating tools; an air compressor, a welding and cutting set, and a laptop computer for diagnosing problems. A 60 kW generator is provided for powering the vehicle with the engine off. There is a large dozer blade at the front and a bracing bar at the rear to steady the vehicle in heavy lifting and winching operations; the dozer blade can also dig fighting positions. A second container on the rear deck carries spare parts, and there is a stand for a complete tank engine. The BREM-80's interior is air conditioned and heated.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$162,098	D, G, AvG, A	2.5 tons	46 tons	4+1	17	WL/IR Spotlight, Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
177/124	40/25	1090	557	Stnd	T6	HF125 HS16 HR10

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C)	500x12.7mm

BREM-L ARV

Notes: The BREM-L is an ARV (Armored Repair Vehicle) based on the BMP-3 chassis. In the BREM-L, the BMP-3 turret is removed and replaced with a small armored cupola on the center right of the vehicle, mounting a PKT machinegun. The left side of the roof has a crane that can lift 6 tons, or 12 tons if a pulley block is installed first. The vehicle's winch has a 20-ton capacity, or 40 tons if a pulley block is installed first. Usually, when the winch is used, a dozer blade mounted at the front of the vehicle is first lowered. There is a load area on the rear hull roof for carrying large stores such as BMP engines and transmissions. The BREM-L is equipped with two pulley blocks, a tow bar, various lengths of rope and cable, and basic tools, tracked vehicle tools, small arms tools, and heavy ordinance tools.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$106,860	D, G, AvG, A	2.5 tons	18.7 tons	3+2	11	Passive IR, Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
176/123	40/25/4	460	184	Stnd	T3	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	2000x7.62mm

BREhM-D

Notes: This is the recovery vehicle member of the BTR-D family. In this role, the BTR-D chassis mounts an A-frame crane with a capacity of 1 ton, or up to 3 tons with block and tackle. The main winch has a capacity of 4 tons, or 12 tons with block and tackle. The winch has 100 meters of cable and is controlled from the commander's position. There is a front-mounted dozer blade that can be used to dig fighting positions or brace the vehicle during heavy winching and lifting operations. For towing, the vehicle has two telescoping tow bars that extend from the rear of the vehicle. The BREhM-D carries a welding set, basic, tracked vehicle, wheeled vehicle, small arms, and heavy ordinance tools, ropes, and cables.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$78,615	D, A	2 tons	8 tons	3	6	Active/Passive IR, WL Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
194/136	40/30/4	300	88	Stnd	T4	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (Bow)	1000x7.62mm

BTR-T

Notes: The BTR-T grew out of a need for a heavily armored engineer assault vehicle. Vehicles such as the BMP did not provide enough protection for engineer squads as they maneuvered into position to breach obstacles.

The BTR-T is a T-55-series hull with a 30mm autocannon elevated over a low-profile one-man turret. There is a pintle mount located on the right side of the turret. The removal of the original turret allows the crew and dismounts to be located forward of the engine. The major drawback of the design is that infantrymen can only exit through hatches on the roof. The BTR-T turret may use the same sort of appliqué armor as the BMP-3, and in fact often does.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

$339,649	D, A	400 kg	38.5 tons	2+5	15	Passive IR, Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
88/62	20/15	500 + 400 in rear drums	155	CiH	T6	TF13 TS5 TR3 HF67 HS16 HR8

Fire Control	Stabilization	Armament	Ammunition
+2	Fair	30mm Autocannon, Twin AT-5 ATGM, PKT or NSVT or AGS-17 (C)	200x30mm, 4xAT-5, 2000x7.62mm or 500x12.7mm or 300x30mm grenades

BTS-T-54-T/TK

Notes: The BTS-T-54-T is one of the Soviet Union's first post-war armored recovery vehicle designs. As the name suggests, it is based on the T-54 chassis. The turret is removed and replaced with a raised superstructure ad a crane that can lift 1 ton. The vehicle has a large dozer blade in the rear to brace it during lifting operations. The BTS-T-54-2 is handicapped by the lack of a winch, so it is limited to towing operations. (The Finnish version of this vehicle, the BTS-2, does have a winch of 12 tons capacity.) In the center of the vehicle is a platform with drop sides to carry tank engines and other large components. The BTS-T-54-2 carries a standard selection of tools for its tasks, including basic, tracked vehicle, small arms, and heavy ordinance tools, as well as rope and a tow bar. Most countries that use the T-55, or have in the past, use this vehicle or the BTS-T-54-TK listed below.

The BTS-T-55-TK is the final development of the T-55-based recovery vehicle for the Russian Army and its allies. The BTS-T-55-TK also uses the more powerful 580 hp engine. It is otherwise like the BTS-T-54-T listed above, but has a more far more powerful 20-ton capacity crane.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BTS-T-54-T	$98,979	D, A	1 ton	36 tons	3+2	13	Active/Passive IR	Shielded
BTS-T-55-TK	$119,734	D, A	1.5 tons	34 tons	3+2	15	Active/Passive IR	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
BTS-T-54-T	99/69	20/15	812	193	Stnd	T6	HF63 HS12 HR8
BTS-T-55-TK	113/79	25/15	812	214	Stnd	T6	HF67 HS16 HR8

Vehicle	Fire Control	Stabilization	Armament	Ammunition
(Both)	None	None	PKT (C)	2000x7.62mm

IMR

Notes: This predecessor of the IMR-2MA was first seen in 1973. It is based on the chassis of a T-55, and during the Twilight War was still being used by many second-line Warsaw pact countries, China, several Middle Eastern nations, and some African countries. In the IMR, the turret of the T-55 is removed and replaced by large crane that can turn through 360 degrees and has a capacity of 2 tons. The crane head may be equipped with a standard lifting head, or other accessories, including a pincer for grabbing, a bucket, or an auger. The front of the IRM has a dozer blade for digging fighting positions, clearing obstacles, or other work. The IRM normally carries an assortment of tools, including basic tools, excavating tools, power tools, construction tools, and air compressor, and a welding and cutting set.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$146,088	D, A	1.2 tons	37.5 tons	2	18	Active/Passive IR, WL Searchlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
113/79	25/15	812+380	214	Stnd	T6	HF67 HS16 HR8

IMR-2M

Notes: This is a more advanced Russian combat engineer vehicle than the IMR, being based on a T-72 chassis. They had replaced most of the IMRs in Russian, Czech, and Polish service by 2000. The turret of the T-72 has been replaced by an armored superstructure, from which is controlled the crane. The crane can be traversed through 360 degrees and has a capacity of 2 tons at a reach of 8.15 meters. The crane may use several heads, including a lifting hook, pincer claws, a bucket, and an auger. The front of the IMR-2M has a dozer blade that is armored against mines and is 1 meter high and 3.38 meters wide. Angle grading as well as straight plowing is possible with this blade. The front of the blade also had an extendible probe that is used to send radio signals to trigger the fuses on mines, explosive shells, and other such hazards. It is 65% likely to detonate any such device it encounters if the fuse is a contact, tilt rod, or radio type. The IMR-2M carries a wide assortment of tools, including basic tools, excavating tools, power tools, construction tools, and air compressor, and a welding and cutting set.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$269,775	D, A	1.5 tons	44.3 tons	2	20	Active/Passive IR, WL Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
133/93	30/20	1000+400	310	Stnd	T6	HF140 HS20 HR12

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C)	500x12.7mm

IMR-2MA

Notes: This is the Russians' newest combat engineer vehicle, based on the chassis of the T-90 tank. Its primary job is to clear obstacles, smooth damaged roadways, and clear rubble from urban areas. As is usual for these converted tanks, the turret is removed, and in its place is a raised superstructure. The dozer blade can smooth a road of about 6 km by the width of the vehicle in one hour, depending on the degree of difficulty of the obstacles, or clear earthwork at a rate of 300 cubic meters per hour, or loose rubble at a rate of about 400 cubic meters an hour. The dozer blade is also mine proof for purposes of clearing mines. The IRM-2MA has a crane with a capacity of 2 tons, a main winch with a capacity of 35 tons and 100 meters of cable, and a secondary winch with a capacity of 15 tons and 120 meters of cable. Normal tools carried include basic tools, excavating tools, power tools, construction tools, an air compressor, and a welding and cutting set. There is a 5kW generator to power the tools, winches, and crane when the engine is off.

Twilight 2000 Notes: This vehicle does not exist.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$300,278	D, G, AvG, A	1.5 tons	47.4 tons	2	19	WL Spotlight, Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
126/88	25/20	1200	310	Stnd	T6	HF180 HS30 HR18

Fire Control	Stabilization	Armament	Ammunition
None	None	NSVT (C)	1050x12.7mm

IRM

Notes: This vehicle is described by the Russians as an "Engineer Reconnaissance Vehicle," and is based on a lengthened BMP-1 chassis (seven roadwheels instead of six). The vehicle is fully amphibious, and may operate fully submerged with the aid of a 10-meter snorkel. The IRM may generate a smoke screen by injecting diesel fuel into its exhaust. The IRM is also equipped with two mine detectors on booms, a sensor for determining the load-bearing capacities of a piece of terrain, devices to determine water depth, surf action, terrain angles, and the thickness of ice. The vehicle is also equipped with a laser rangefinder, an artillery aiming circle, and two radios with a range of 20 kilometers. The IRM is equipped with a rocket-powered grapple for self-recovery, even under enemy fire. At the rear is a bank of 12 solid rockets to assist in this recovery if necessary. The IRM may use BMP-1 appliqué armor on the hull, but not on the turret.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$66,714	D, A	1 ton	17.2 tons	2+4	10	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
121/85	25/20/3	600	110	CiH	T3	TF4 TS4 TR4 HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT	1000x7.62mm

MTP Technical Support Vehicle

Notes: Russia and Pact forces use this armored repair and recovery vehicle. It is based on the closed-top version of the BTR-50, and is used to support armored personnel carriers such as the BTR-series and BMP-series. Recovery equipment carried includes anchors, tow bars and cables, block and tackle, oil and fuel pumps, a 5kW generator, a complete welding set, an air compressor, and a set of tools appropriate for working on wheeled and tracked vehicles. Ample room is provided for spare parts, and there is space on the rear deck for carrying a power pack or other large spares. The MTP also has a crane with a capacity of 1.5 tons and a reach of 2.85 meters, and a winch with a capacity of 8 tons (15 tons with block and tackle installed) and 60 meters of cable.

The MTP has a raised superstructure with hatches for the crew and commander in it. The driver's hatch is in the normal place, and there are two doors in the rear. There is a firing port in each side of the crew compartment and in one of the rear doors that can take an AK-series assault rifle or the PK machine gun.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$61,491	D, A	1.5 tons	14.5 tons	5	9	Headlights	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
110/77	25/15/4	400	88	Stnd	T3	HF3 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	PK (C)	1250x7.62mm

MTP-LB Technical Support Vehicle

Notes: Similar in concept to the MTB technical support vehicle listed above, this vehicle is based on the MT-LB chassis. The basic form is unchanged, except for the addition of a crane, winch, and platform on the rear deck for carrying engines and other large assemblies. The MTP-LB is capable of land as well as amphibious recoveries. The crane is driven by the winch (the winch and the crane cannot be used at the same time), and has a capacity of 1.5 tons. The crane is an A-frame structure mounted on the front of the vehicle that has a reach of 4.2 meters. The winch may be used by itself, in which case the capacity is 6.12 tons with 80 meters of cable. There is a jack located on the front of the vehicle which may jack up to 15 tons. (This jack must be moved to the cargo platform before amphibious operations can take place.) Other equipment carried by the MTP-LB includes tow bars and tow cables, chock blocks, electric and gas welding and cutting gear, a vehicle decontamination kit, and a full range of tools. The MT-LBs cupola has been removed and replace with a hatch and periscope. And there are crew hatches on the roof between this area and the cargo platform. There are also two doors on the rear of the vehicle. While most versions of this vehicle are armed with a PK, the Polish version of the MTP-LB is armed with an NSV heavy machinegun.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$64,924	D, A	2 tons	12.3 tons	2	7	Headlights	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
133/93	30/20/3	450	88	Stnd	T3	HF4 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	PK (C) or NSV (C)	2500x7.62mm, or 1500x12.7mm

MTU-20

Notes: This is a tracked cantilever-type bridging vehicle based on a T-55 chassis. The turret has been removed so the bridge span can lay flat on the deck area. The bridge can span 18 meters. It weighs 7 tons and can support 40 tons, taking 5 minutes to deploy and 7 minutes to recover. Other than Russian and Pact forces, the MTU-20 is used by Afghanistan, Egypt, Finland, India, Israel, Nigeria, and Syria.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$132,332	D, A	500 kg	37 tons	2	16	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
108/76	25/15	960	214	CiH	T6	TF4 TS4 TR4 HF67 HS16 HR8

MTU-72

Notes: This AVLB is based on the T-72 chassis, and uses a bridge similar in design, but heavier then, the bridge of the MTU-20 listed above. This bridge can span a gap of 18 meters and support 50 tons. Three minutes are required to lay the bridge, and 8 minutes to recover it. The bridge weighs 6.4 tons. The MTU-72 carries a dozer blade at the front to clear obstacles to bridge laying or otherwise prepare bridging sites. The MTU-72 is used only by Russian and Pact forces.

There is a similar vehicle in Czech service called the MT-72. Weight for this vehicle is 41.5 tons, and the bridge weighs 6 tons.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$193,764	D, A	300 kg	40 tons	2	18	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
138/97	30/20	1000	310	CiH	T6	TF4 TS4 TR4 HF120 HS18 HR8

MTU-90

Notes: This is an AVLB based on the T-90 chassis. It uses a triple-section bridge similar in design to that of the M-1 Wolverine AVLB. This bridge weighs 6.62 tons and can span a 24-meter obstacle, supporting a vehicle weighing 50 tons. The bridge is easy to lay and recover, requiring only 2 minutes to lay and 2.5 minutes to recover. The MTU-90 is used only by Russian forces.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$351,718	D, G, AvG, A	300 kg	45.5 tons	2	18	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
130/91	30/20	1200	310	CiH	T6	TF4 TS4 TR4 HF180 HS30Sp HR18

PMM-2

Notes: This Russian vehicle has the tracks and suspension of the T-64 tank, and upper chassis of the PTS-2 amphibious carrier. The PMM-2 uses a floating bridge, and may be used as either a bridge or ferry. When used as a bridge or ferry, the PMM-2 can carry 42.5 tons, but it is unable to carry this weight on land. Up to 10 PMM-2 vehicles can be latched together to form long bridges; each PMM-2 unit can bridge a gap 17 meters wide (or float vehicles that long). PMM-2s can operate in bodies of water with currents of up to 2 meters per second.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$69,066	D, A	500 kg	30 tons	3	8	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Type	Config	Susp	Armor
210/126	43/26/5	1000	182	Bridging Vehicle	CiH	T6	TF4 TS4 TR4 HF6 HS3 HR2

PSD VPV

Notes: This Czech vehicle is used for support of BMP-series, BRDM-series, and BTR-series vehicles, and other vehicles with weights up to 15 tons. It is based on the BVP-2 chassis (the Czech and Slovakian version of the BMP-2), and is very similar in layout and equipment carried to the Russian BREM-2. The crane is operated by the commander, there is a mechanic that has controls over the winches, and the driver, who is also a mechanic. Production began in 1984 and 363 VPVs were built.

The turret is removed and replaced with a cable drum and a hatch to access the winch and crew compartment. The winch can pull 17 tons, or double that with the use of return pulleys; this winch has 120 meters of cable. The VPV has a dozer blade that is lowered to brace the vehicle in winching and craning operations. The VPV has a crane mounted at the rear of the vehicle that can lift 6.5 tons and has a reach of 4.5 meters. The vehicle is equipped with full tool sets for work on tracked and wheeled vehicles, as well as a tow bar, welding set and cutting tools, and an air compressor.

The engine is a UTD-20/3 multifuel developing 300 horsepower, and the transmission is manual. Fuel capacity has been increased to power all the various mechanized tool.

The VPV retains the amphibious capability of the BVP-2, but will swamp if waves more than 100mm or currents over 1.2 meters per second are encountered. Czech forces use the VPV, as does Hungary (where it is known as the BMP-1VPV); a few are also used by Russia to supplement their BREM-2s.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$226,208	D, G, AvG, A	3 tons	14.3 tons	3	11	Passive IR (D), Image Intensification (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
154/108	43/30/4	480	105	Stnd	T2	HF8 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	PKT (C)	2000x7.62mm

ZTS VT-72B

Notes: The VT-72B is a recovery vehicle based on the T-72 chassis, built by Czechoslovakia. It is very similar to the BREM-1 in many respects; visually, the biggest difference is that the VT-72B's crane is on the right side of the superstructure instead of the left.

The T-72's turret is removed and replaced with an armored, raised superstructure. The crane, on the front right and folding along the right side, can lift 19 tons and has a reach of 7.6 meters, and there is a load platform on the rear of the superstructure that can carry a load of 4 tons. The winch is located in the center of the vehicle, has 200 meters of cable and can pull 40 tons; the actual drum is in front of the engine. There is also a secondary winch that can pull 2.5 tons and has 400 meters of cable. Its full width dozer blade located at the front of the vehicle can brace the vehicle. The dozer is also used to dig defensive positions for itself and other vehicles. There is also a rack at the rear of the vehicle for fuel and POL drums and jerry cans; up to 200 liters of various substances may be carried in this rack, and the VT-72B has three pumps which can be attached to the drums or cans to pump their contents as necessary. Two grease guns are also provided. The VT-72B carries a 5kW generator for use with power tools or the welding equipment and air compressor (both issued with the vehicle). Other equipment also includes tools appropriate for working on tanks, excavating tools, and a tow bar.

The driver is on front left at the top of the superstructure (and raised significantly from the driver's position on the T-72). The commander is to his left and equipped with a heavy machinegun on a pintle mount. The machinegun is equipped with a cradle and a collimator sight. The commander normally controls the plow, the winches, and the crane, though in practice one or more are controlled by a control box outside the vehicle on a 7.6-meter cable. The other three crewmen are inside the center of the hull; all crewmembers are mechanics, and one is often specifically a turret mechanic. There is an NBC Overpressure system for the crew, with a vehicular NBC backup. There are no smoke grenade launchers, but the VT-72B can injects diesel fuel (but not alcohol) into its exhaust to create a smoke screen.

Czechoslovakia uses the VT-72B in place of the BREM-1; the vehicle is also used by India.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$616,224	D, A	4 tons	46.5 tons	5	27	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
111/78	31/22	1000+400	212	Stnd	T6	HF120 HS18Sp HR8

Fire Control	Stabilization	Armament	Ammunition
+1	None	NSV (C)	500x12.7mm

ZTS MT-72 AVLB

Notes: As the Slovakians locally produce the T-72, it was natural for them to choose it as a base for an AVLB. The MT-72 is thusfar used only by Slovakia and the Czech Republic, though it is available for export sales. The bridge designed for the MT-72 spans 20 meters; if necessary, two bridges may be laid on top of each other to span 34 meters. The bridge weighs 4 tons and can support 50 tons. If necessary, the MT-72 can use the bridge of the MT-55A designed by the Czech Republic (which is also used by Slovakia). Laying the bridge takes 3 minutes, while recovering it takes 5 minutes. The MT-72 cannot swim, but with a special adapter, can ford up to 4.2 meters. Smoke grenade launchers are not normally mounted, but the MT-72 can inject diesel fuel into its exhaust to create a thick, oily smoke screen.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,473,021	D, A	4 tons	41.5 tons	2	39	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
141/99	39/28	1000+400	304	Stnd	T6	TF4 TS4 TR4 HF120 HS18Sp HR8*

Denel Olifant ARV

Notes: This is an Armored Recovery Vehicle variant of the Olifant 1 main battle tank. These were conversions of existing Olifant tanks and were done only for the SANDF, with no exports being sought or done.

In this role, the turret is removed, and a crane with a capacity of 10 tons is mounted on the left side of the raised superstructure. The front has a dozer blade for bracing, and can also be used for obstacle-clearing; it has an AV of 4. The internally-mounted main winch can be led out the front or the rear and has a capacity of 60 tons (115 tons with block and tackle) and 80 meters of cable. An extendible boom crane reaches over the rear of the vehicle, with a capacity of 30 tons. The Olifant ARV is equipped with tools for tank repair including basic tools, tracked vehicle tools, small arms tools, heavy ordinance tools, and an arc welder. There are two cupolas on the roof with machineguns and there are four sets of four-barreled smoke grenade launchers, one on each corner of the superstructure.

During the conversion, the engine of the Olifant Mk 1A was skipped and the diesel engine of the Olifant Mk 1A was put into the vehicle. The engine is a 12-cylinder 750-horsepower diesel integrated powerpack with a semiautomatic transmission. All electrical systems were also upgraded, and the ARV received a small computer to assist the mechanics with information about the SANDF's vehicles. The driver's seat is raised further up, as the roofline of the superstructure is also raised. The commander has a stand and hatchway in front of the superstructure, with a weapon on a pintle mount; this is usually a double weapon. Three more mechanics ride in the center of the hull.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$612,514	D, A	5.42 tons	57.5 tons	4	21	Passive IR, Image Intensification	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
114/80	32/22	1240	272	Stnd	T6	HF64 HS14 HR10

Fire Control	Stabilization	Armament	Ammunition
None	None	2xSS-77 or 2xM-2HB or SS-77 and M-2HB	5000x7.62mm or 1500x.50 or 2500x7.62mm and 750x.50

Hyundai K-1 ARV

Notes: This South Korean armored recovery vehicle is based on the chassis of the K-1 main battle tank. However, it uses a large number of components of German origin, particularly from the Buffel, and leaving to a marked resemblance to the Buffel. The Malaysians also use the K-1 ARV, which they designate the K-1M.

The K-1 ARV is a powerful vehicle capable of towing a tank the size of the M-1A1, or the K-1 (the vehicle it is meant to recover). The K-1 ARV's winch can pull 35 tons, or tow 70 tons when the guide pulley is installed, and has 150 meters of cable. It is of the dual capstan type. The vehicle also has an auxiliary winch with a capacity of 20 tons and 260 meters of cable. The K-1 has no turret, but has a superstructure in its place. The crane is on the right of this superstructure, has a capacity of 25 tons, has a traverse of 270 degrees, and can be raised to 70 degrees angle. The K-1 ARV has a dozer blade on the front of the vehicle for earth clearing or bracing, and can move 170 cubic meters per hour. The K-1 ARV has a 60kW auxiliary power unit that can power all machinery except the tracks. The crane and winches cannot be overloaded as the devices will automatically power off in an overload situation. The crane, however, is sufficient for lifting almost all turrets and can also lift one end of t vehicle for repairs underneath. There is a platform on the rear deck that can carry an M-1 or K-1 power pack (about 5 tons). On the hull front are eight smoke grenade launchers. It normally carries a tow bar and a full range of tools, ropes, cables, and excavating tools.

The K-1 ARV has a crew heater, air conditioner, and NBC Overpressure system; the vehicle has three doors in each side of the hull to allow access to crewmembers and storage for equipment. The driver is at the top of the glacis on the left, while the commander is in the front center, with his weapon on a pintle mount. A small computer helps the crew by storing documents, plans, and especially, with tech information on all of the country's military vehicles.

The engine is the K-1's MTU MB 871 Ka-501 diesel, developing 1200 horsepower. The transmission is not only automatic, it is adjustable hydropneumatically. The vehicle is divided into five sections for the automatic fire detection and suppression systems' purposes. The K-1 ARV is not amphibious, though with short preparation, a depth of 2.3 meters can be forded.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$148,534	D, A	5 tons	51.1 tons	33	19	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
159/111	44/31	1815	395	Stnd	T6	HF75 HS12Sp HR12

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1000x.50

Hyndai K-1-M AVLB

Notes: This is a South Korean armored vehicle-launched bridge based on the chassis of the K-1 main battle tank. The bridge is a British design, but the vehicles and bridges are built in South Korea.

In this role, the K-1's turret is removed and replaced with the bridge and launching equipment. The bridge weighs 12.9 tons, can support 66 tons, and is 20.5 meters long. Deploying takes 3 minutes, and recovery 10 minutes. There is a small cupola below the folder bridge that has a small hatch, all-around vision blocks, and a pintle mount for it's machinegun. This gun may remain mounted while the bridges are carried, though field of fire is severely restricted while the bridges are on top of the vehicle. On each front fender is a cluster of six smoke grenade launchers,

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$615,427	D, A	400 kg	54.7 tons	2	23	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
162/113	45/31	1815	433	CiH	T6	TF4 TS4 TR4 HF75 HS12Sp HR12*

Fire Control	Stabilization	Armament	Ammunition
None	None	M-60 (D)	1650x7.62mm

Daewoo K-288A1

Notes: This South Korean armored recovery vehicle is based on the Korean Infantry Fighting Vehicle. The turret is removed, and in its place is a crane with a lifting capacity of 6 tons, and a platform for a KIFV power pack. The firing ports of the KIFV are deleted. The recovery winch is located internally, has a capacity of 10 tons, (20 tons with block and tackle) and has 150 meters of cable. The K-288A1 carries tools appropriate to its task of recovering and repairing KIFVs, such as tow cables and a bar, and basic, electronic, tracked vehicle, small arms, and heavy ordinance tools. It has a small computer with a library of tech manuals and such documents. At the front of the superstructure on the left side is a small floodlight for working at night. The driver's position remains on the front left deck, and the commander remains the same spot as on the K-200A1. The rear door and ramp remain on the vehicle. There are no other hatches on the roof, and the remaining two crewmembers usually leave and enter through the rear door or ramp.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

$94,873	D, A	1.7 tons	14.5 tons	4	9	Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
124/87	34/24/3	400	78	Stnd	T3	HF8Sp HS5Sp HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	600x.50

Peugeot Talbot CZ-10/25E Alacran

Notes: This CEV was converted from older M-60 stocks in Spain with the help of General Dynamics. They were built only for the Spanish Army and only 38 were made. Peugeot Talbot can resume conversions if necessary.

For this conversion, the turret is retained, but the gun is replaced by a crane arm with a bucket capable of digging 420 liters at one scrape and capable of lifting 7 tons. The shovel may be replaced by a NPC hydraulic hammer or a VTC-30 cutting tool, used to cut into thick roadway, concrete, rocks, water mains, etc. The vehicle has a dozer blade able to be set at very low angles and can rip the top 0.3 meters of asphalt off the top of a roadway, for example. The blade is 4 meters wide. The blade may be replaced by a mineclearing plow and an automatic pathmarking flag dispenser. At the rear is a 25-ton winch, which can doubled by use of black and tackle.

The crew retains there M-60 positions, with the "gunner" controlling the crane, the commander in the same cupola as in the M-60 tank, and the driver in the center front hull.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$428,774	D, A	1.8 tons	51.5 tons	3	19	Passive IR (D), WL Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
122/86	34/24	1420	273	Stnd	T6	HF56 HS15 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	600x.50, 40xAPERS Mines, 40xAT Mines, Engineer Demo Chest, 40 kg C4.

GAMESA M-47 VR

Notes: In 1994, the Spanish Army decided to rework a number of their aging or obsolete vehicles; one of these was the M-47E1 main battle tank. The tank was rebuilt into the M-47 VR, an armored recovery vehicle. Some 22 of these conversions were made, with deliveries being completed in 1996. Though intended solely for the recovery of M-48s and M-60s, it has been discovered that they are capable of recovering Spain's new Leopard 2s. This has given the Spanish Army extra time to decide what will replace them.

Like most such vehicles, the M-47 VR has had it's turret replaced by a raised superstructure. The front of the vehicle haa a dozer blade 3.7 meters wide and 0.9 meters high; this is normally for bracing while using the crane or winches, but has a secondary role of clearing obstacles and digging fighting positions. The blade also has ripping teeth on it's bottom. The main winch is inside the hull and can pull 35 tons, or 70 tons with block and tackle, and with 120 meters of cable. In the front of the vehicle is an auxiliary winch with a capacity of 4 tons, or 8 with block and tackle. On the front right side of the M-47 VR is it's crane, which can be rotated through 360 degrees. It has a capacity of 22 tons. In the case of the winch and crane, there are automatic overload prevention devices that stop the devices if they hit their load limits. The crane can lift a full load up to 9.75 meters. The M-47 VR carries a full set of tools for vehicular work, including power tools, and places to plug them in are on the right rear side of the vehicle. The tools can be powered by the engine, or by an APU with 5kW power. In case of breakdown of the engine and APU, there is a small power unit with just enough power to return the dozer blade, winches, and crane to the travel position in preparation of it's towing by another ARV. A complete M-48, M-60, or Leopard 2 powerpack can be carried on the flat rear deck.

The driver's position is at the front of the left superstructure The commander is in the center front with a pintle-mounted weapon. The other two crewmembers ride inside the vehicle. The crew has an NBC overpressure system, and the main compartments of the M-47 VR have fire detection and suppression systems. A small computer with technical information for Spanish Army vehicles is also installed.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$791,052	D, A	4 tons	46.45 tons	4	29	Passive IR (D), WL Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
132/93	37/26	1514	276	Stnd	T6	HF50 HS14 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	1000x.50

Hagglunds Bgbv-82

Notes: This is a Swedish armored recovery vehicle that bears a passing resemblance to an M-113, but is in fact a different vehicle; the chassis is in fact related to that of the Brobv-941. It was designed in 1973 to recover the S-Tank and similar-sized armored vehicles. The Bgbv-82 can also double as an engineer vehicle to clear obstacles and to prepare river-crossing points. The Bgbv-82 mounts a cupola with a 20mm autocannon (identical to that on the Pbv-302), and shares many automotive components with the Ikv-91 tank destroyer. The gunner has a sight equal to binoculars in power. On each side of the turret are eight smoke grenade launchers. The driver has a hatch in the center front of the deck, the commander is to the right of the driver with his own hatch, and the turret is to the left and rear of the driver. The winch operator is to the rear of the driver inside the hull, and has an overhead hatch on the deck. When two ground spades are lowered at the rear of the vehicle, the winch may pull with 60 tons of force and 145 meters of cable. (Block and tackle is not normally carried.) The Bgbv-82s crane may lift 5 tons if extended 1.8 meters, 3.5 tons if extended 2.5 meters, and 1.5 tons if extended 5.5 meters. The Bgbv-82 also has a dozer blade in the front of the vehicle for bracing, digging, and area preparation. The Bgbv-82 is equipped with a large selection of tools, such as wheeled vehicle, tracked vehicle, basic, and excavation tools. The powerpack of the Bgbv-82 (or Brobv-941) consists of a unit including the engine, transmission, torque converter, clutch, steering clutch, gearbox, and steering gearbox. Amphibious operation requires only the erection of a trim vane.

Oddly enough, the Bgbv-82 does not have a vehicular NBC scrubber, though plans for installing one were made during the design phase and the hookups for one are still found on the hull.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$328,806	D, A	6.5 tons	19.8 tons	4	16	Passive IR (D)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
125/88	36/24/3	550	109	CiH	T3	HF3Sp HS2Sp HR2*

Fire Control	Stabilization	Armament	Ammunition
+2	None	20mm Rh-202	505x20mm

*Floor and Roof AV are 2Sp.

Hagglunds Brobv-941

Notes: This is a Swedish short-span AVLB mounted on the same chassis as the Bgbv-82 recovery vehicle. In this role, the vehicle is topped with the equipment to launch a single span bridge that is 15 meters long and has a capacity of 50 tons. Before the bridge is deployed, a forward dozer blade is lowered to brace the vehicle. The bridge weighs 7 tons. The bridge takes 5 minutes to lay or recover, and the crew may remain under armor protection during these operations. The Brobv-941 is amphibious; when it swims, the bridge is towed floating behind the vehicle. The chassis of this AVLB is the same as that used by the Bgbv-82, but the Brobv-941 has no autocannon turret. Instead, the gunner has a pintle-mounted weapon, and the commander has a standard machinegun, not on a pintle mount. Like the Bgbv-82, the Brobv-941 has provisions for an NBC pack, though none was ever fitted to the vehicle.

The Brobv-941 was requested in 1968, and all 17 vehicles in Swedish Army service were built in 1972.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$152,868	D, A	400 kg	28.4 tons	4	22	Passive IR (D)	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
100/70	28/19/3	550	108	CiH	T3	TF4 TS4 TR4 HF3Sp HS2Sp HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG, MAG (C)	1500x7.62mm

Hagglunds Bgbv-90 ARV

Notes: It is an armored recovery variant of the CV-90 IFV. In addition to Sweden, the Bgbv-90 is used by Norway and Finland.

In this role, the turret is deleted, and a crane and winch are mounted in the vehicle. The commander has a raised cupola, but the vehicle's machinegun is a simple infantry model, not on a pintle mount or part of the cupola. (The Bgbv-90 does have an obscene amount of ammunition as a part of its basic load, though.) The Bgbv-90 is equipped with a crane able to lift 6 tons, and the winch is able to pull 61 tons to the front, 33 tons to the rear, and 8.4 tons to the side. The winch is operated via two capstans inside the vehicle at the rear of the crew compartment. For maximum pulling efforts, the vehicle must be braced with the dozer blade. Two banks of six smoke grenade launchers are provided.

The Bgbv-90 has the sort of tool set one would expect to be on such a vehicle, from basic tools to power tools to an arc welder and air compressor. It also carries a selection of spare parts -- the exact mix and nature depends upon the vehicles it is supporting. A ruggedized laptop is carried that has most of the tech manuals written by the Swedish Army. The vehicle has air

conditioning, heating, and an NBC overpressure suite. It has a automatic fire detection and suppression suite for the vehicle. The rear ramp is retained along with the door set in it. and the roof has a second hatchway in it..

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,193,850	D, A	2.5 tons	23.6 tons	5	24	Passive IR (D), Image Intensification (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
166/116	46/32	610	111	CiH	T4	TF7 TS4 TR4 HF18 HS7 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG	4000x7.62mm

Hagglunds Skorpion/Bv-206

Notes: This minelayer was produced for Sweden by Germany, in small numbers, to allow minelaying in snowy conditions. In this role, the rear module of the Bv-206 has four minelayer modules, containing a total of 400 mines. A self-destruct may be programmed, and densities of 0.05 to 0.3 may be laid. Mines are ejected obliquely to the rear, on either side. A typical vehicle can lay a minefield with a density of 0.2, 1000x50 meters, in 4 minutes. Once started, minelaying is automatic, but may be stopped at any time. Typical mine is an antitank mine, though antipersonnel mines may also be laid.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$97,641	D, A	300 kg	6.8 tons	2	6	Headlights	Enclosed

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
141/99	39/27/4	360	44	Stnd	T2	HF1 HS1 HR1

Fire Control	Stabilization	Armament	Ammunition
None	None	MAG, Minelayer	500x7.62mm, 400xMines

SW Brückenlegepanzer 68/88

Notes: In the original design for the BruPz, the AVLB was meant to be based on the Pz-61 MBT. There were, however, considerable design and production delays, and when it came time for a prototype, the Pz-68 MBT became available. SW dispensed with the original design and based it on the chassis of the more powerful Pz-68 instead. There have been no export sales, and Switzerland has never put it on the export market. Germany offers the bridge and bridgelaying machinery for export along with it's own design, but no sales of the Swiss-designed system have been sold.

The turret is removed and replaced with a single-span bridge and laying machinery. The bridge and bridgelaying machinery were designed by SW, but used a German Jung-Jungenthal design as a base, the one used on German conversions of the Leopard 1 and M-48 in their conversions to the AVLB role. The bridge has a weight of 9.8 tons, has a length of 18.23 meters, and can carry 60 tons in an emergency, though Swiss regulations normally limit the load carried to 50 tons. The laying and recovery is fully automatic once started and can be done without the crew leaving the vehicle or unbuttoning. The bridge takes 2 minutes to lay and 5 minutes to recover. The bridge is deployed by the bridge operator sliding a beam across the gap to be crossed, then using it as a guide rod to lay the bridge.

The chassis is almost unchanged from that of the Pz-68, with an MTU MB-837 diesel developing 660 horsepower. The driver is in the same center front of the hull, with three vision blocks; the center one can be replaced with a night vision block. The commander and bridge operator are seated side by side in the center of the hull; the commander has vision blocks on all but the right side, and the bridge operator has vision blocks to all but the left side. The BruPz-68/88 is not normally armed as a part of the vehicle, except for the personal weapons of the crew and one infantry-type machinegun on a bipod. There are four smoke grenade launchers on each side of the glacis.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,195,609	D, A	600 kg	47 tons	4	20	Active/Passive IR (D)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
119/83	33/23	855	237	CiH	T6	TF4 TS4 TR4 HF43 HS13 HR8*

Fire Control	Stabilization	Armament	Ammunition
None	None	M-51 (C)	1000x7.5mm

SW Entpannungspanzer 65/88

Notes: Similar to the story of the BruPz, the EntpPz was originally to be based on the chassis of the Pz-61 MBT . Long lags in development, prototyping, and production led to the adoption of the Pz-68 chassis instead of the older Pz-61. The EntpPz-68 is not only used to recover and repair the Pz-61 and Pz-68, but also the M-109 and the Swiss variant of the Leopard 2.

The hull is of sheets of steel, with the crew at the front and the engine at the rear. The crew has a door on the left side of the hull towards the front, and there are hatches for the driver and commander on the front deck. To the rear of the driver is a second cupola for the crane operator. The commander's cupola is armed with an M-51. The rear area is mostly open, with sides of sheet steel. The driver is in the front right, and he has three vision blocks; the center one can be exchanged for a night vision block. The commander is behind him. The crane operator's cupola has all-around vision blocks, as does the commander. The driver and crane operator have armored enclosures. Four smoke grenade launchers are found on the front left side, and are launched over the front of the vehicle. The crew compartment has an NBC overpressure suite.

The main winch has 120 meters of cable and has a capacity of 25 tons, or 75 tons with block and tackle. The auxiliary winch has 240 meters of cable and has a capacity of 10 tons. On top of the vehicle is an A-frame crane with a capacity of 15 tons, enough to lift the complete turret of most vehicles in Swiss service. At each base of the A-frame is a hydraulic jack, used to make minor adjustments while lifting. At the front is a dozer blade for bracing, and with a secondary purpose of digging vehicular fighting positions. The Entp Pz 65/88 is normally equipped with excavating tools, basic tools, tracked vehicle tools, wheeled vehicle tools, welding gear, an air compressor, a tow bar, and various ropes, chains, and pulleys.

Being a subtype of the Pz-68, the EntpPz-68 is powered with an MTU MB-837 diesel developing 660 horsepower. An auxiliary power unit is used to power the tools at a halt and develops 10 horsepower.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,077,212	D, A	6 tons	39.8 tons	5	31	Active/Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
121/85	34/24	870	208	Stnd	T6	HF43 HS13 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	M-51 (C)	3200x7.5mm

FNSS ACV-300 ARV

Notes: This is basically a more capable variant of the AIFV ARV, and is designed for the repair and recovery of like-sized vehicles.. The ACV-300 ARV has a winch has a capacity of 9.07 tons and 100 meters of cable and can be pulled to the front or rear, with the drum inside the lower hull. The ACV-300 ARV has a crane has a capacity of 3.09 tons and a reach of 5 meters at full power; lifting power decreases as the crane approaches 7meters, which it is maximum reach. The vehicle is equipped with the following tools: basic, excavating, tracked vehicle, wheeled vehicle, small arms, heavy ordinance, and an air compressor. The ACV-300 ARV can replace up to 5 ERA blocks, and carries a selection of spare parts. It can tow a trailer that is designed to take no driving ability away from the ACV-300 ARV, and normally carries more spare parts and a small workshop for more detailed work. There is no blade or outriggers for stability, but the treads and wheels can be positively locked in place. The rear retains the rear ramp that the ACV has, along with the door in the ramp. The gunner's cupola remains, and is armed with a heavy machinegun or automatic grenade launcher. The commander's position is likewise retained; both have all-around vision blocks, and can replace the middle vision block with a night vision block. The driver has vision blocks in a semicircle around the front and sides, and the middle one can be replaced with a night vision block. The commander's machinegun may aim and fire (but not reload) under fire. ACV-300, in general, uses a hull similar to the AIFV, though the armor is a bit better than the AIFV, and some additional attention is paid to belly armor. The hull front and sides incorporate spaced armament with ceramic sandwich panels. The engine remains a Detroit Diesel 6V-53T developing 300 horsepower, along with a fully automatic transmission along with a conventional driver's station. The ACV-300 ARV is fully amphibious, propelled in water by its tracks. The firing ports, except for the one in the rear door, have been deleted. Only one passenger seat is provided; normally he monitors the vehicle's position and where they are supposed to be, and gives the correct courses to the driver. He has the equivalent of a BMSS and a GPS, as well as a laptop with digital versions or field and tech manuals. He is facing to the rear at a sort of desk.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,257,014	D, A	1.2 tons	14 tons	4	12	Passive IR (D, G, C), WL/IR Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
164/115	46/23/5	410	109	Stnd	T2	HF6Sp HS4Sp HR4Sp*

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB	2000x.50

Belly armor is 4Sp; roof armor is 4

FNSS ACV-15-AEV

The ACV-15 AEV is based on the stretched ACV-15 chassis, and was built not only to give the crew more room to work and carry engineer supplies. Engineer supplies include two engineer demo chests and 40 kilograms of C4 to remove obstacles; other supplies include a chain saw, a round saw, and numerous chains and ropes for dragging obstacles free. Also included is an enhanced pioneer tool kit, and a non-powered tool to split logs which is more efficient than simply wailing on it with an axe. (An axe and an adze are part of the pioneer tool package, of course.) The armor package is improved in the same manner as the ACV-15, and the gunner has an OHWS with a modernized version of the M-2HB.

The driver and commander are in the same place as on the ACV-300 ARC, except that the commander is on a raised cupola that can be manually rotated. The gunner's position is replaced with the OHWS station. The vehicle is heated and air-conditioned, and it has a collective NBC system for the crew to hook up when on board. The vehicle has a raised roof similar to the CPV version, and a winch with a capacity of 10 tons and 100 meters of cable.

The vehicle is powered by a Detroit Diesel 6V-53T, an upgraded version which develops 350 horsepower. Transmission is automatic, and a mine rake can be attacked to the drive sprocket which has an AV of 8 vs. mines (it will not protect the vehicle).

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$1,375,021	D, A	3 tons	20 tons	4	12	Passive IR (D, G, C), Thermal Imaging (G), WL/IR Spotlight (C)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
124/87	35/24	501	131	Stnd	T2	TF6Sp TS5Sp TR4 HF12Sp HS9Sp HR7Sp*

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB	2000x.50

*Belly armor is 5, except under the driver and gunner, where it is 6.

AAVR7A1

Notes: This vehicle is the recovery version of the AAVP7A1 amphibious APC used by the US Marines and other countries. (The US Marines, Argentina, Brazil, Italy, South Korea, Spain, Thailand, and Venezuela use the AAVP7A1 and the AAVR7A1.) The cupola of the AAVP7A1 is not present on this vehicle; instead, the AAVR7A1 has a mount on the commander's position for an M-60 machinegun. On the right side of the hull is a crane with a telescoping arm that reaches 6.55 meters and can lift 2.72 tons. The winch is at the rear and has a capacity of 13.61 tons. Also installed in the vehicle is an air compressor, 5 kW generator, workbenches, welding gear, and a complete range of tools. A tent comes with the vehicle that can be erected at the rear to extend the workspace.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$107,721	D, A	2.5 tons	23.64 tons	3	13	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
115/81	25/15/4	647	147	Stnd	T3	HF12 HS8 HR7

Fire Control	Stabilization	Armament	Ammunition
None	None	M-60 (C)	850x7.62mm

M-9 Armored Combat Earthmover (ACE)

Notes: The ACE is basically a military version of a bulldozer, with an armored body. It entered the US Army inventory in 1977, and is perhaps one of the most common engineer vehicles in the world. Most of these vehicles were upgraded starting in 1985 to extend their operational life. Later production included nearly 200 vehicles for South Korea.

The ACE is a fast vehicle designed to keep up with Infantry Fighting Vehicles and Main Battle Tanks, in order to clear obstacles, create breaches in fortifications, and fill craters and ditches for those vehicles. The ACE is also used to prepare positions and dig fortifications. A secondary role for the ACE is the smoothing and creation of makeshift roads and airfields in rough terrain areas.

The ACEs primary feature is its large front-mounted scraper and dozer blade/bucket. The scraper has a capacity of 6.7 cubic meters, and the dozer blade/bucket can move 8 tons at a time. The ACE also has a winch with a capacity of 15.9 tons, and has a 60-meter cable. The ACE is equipped with a bilge pump for amphibious operations. (It is amphibious with preparation.)

The ACE is air-portable in any aircraft at least the size of the C-130 Hercules.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$20,346	D, A	1.8 tons	16.28 tons	2	9	Headlights	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
125/87	25/20/3	507	109	Stnd	T3	HF3 HS3 HR2

M-58 Wolf

Notes: This is the US Army's current standard smoke generation vehicle, along with the M-56 Coyote. It is also used by several of America's allies, and many were used in the Middle East, Europe, and in the Continental US. It uses a tactical smoke generator of the 1994-2000 period type on the latest M-113A3 chassis, along with the RISE power pack improvement that is normally fitted to the M-113A4. This allows for greater speed to keep up with Bradley and Abrams formations. The Wolf uses smoke fuel and fog oil tanks twice as large as the standard tactical smoke generator.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

$125,895	D, A	300 kg	13 tons	3	8	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
145/101	30/20/3	400	101	Stnd	T2	HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50

M-60 AVLB

Notes: This is an armored vehicle-launched bridge most commonly found in US service, and is also used by Germany, Israel, Pakistan, Singapore, Spain, and Taiwan. As the name suggests, it is based on the M-60A1 main battle tank, with a bridge that has a capacity of 54.43 tons. The bridge may cross a gap of 18.29 meters, and takes 3 minutes to deploy and 10 minutes to recover. By itself, the bridge weighs 13.38 tons. The crew does not have to leave the vehicle or open the hatches to deploy or recover the bridge.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$151,186	D, A	200 kg	55.21 tons	2	22	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
94/66	20/15	1420	276	CiH	T6	TF4 TS4 TR4 HF52 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	525x.50

M-60 AVLM

Notes: The M-60 AVLM (Armored Vehicle Launched MICLIC) began as a field modification of a standard M-60 AVLB. The bridge is removed from the vehicle, the bridge deployment machinery retracted, and the line charge machinery of a standard M-58A3 MICLIC (Mine-Clearing Line Charge) trailer mounted on top of the hull at the rear. This allows a mine-clearing solution much more mobile than a trailer while carrying the ability for follow-up shots, as well as allowing the engineers to be better protected than in a truck, HMMWV, or even APC towing a trailer. The MICLIC launcher carries two line charges; a further four are carried on the vehicle for follow-up shots, but the crew must leave armor protection to load these charges. The line charge is fired from the AVLM, and starting 20 meters from the AVLM, a 107-meter long line of C4 charges are laid straight ahead. Each meter of the charge contains 7.44 kg of C4, for a burst radius of 40 and a concussion value of 11. Any mines in this radius may be set off, causing their own explosions if they do. Once all sympathetic detonations have occurred, the AVLM, other vehicles, and personnel may proceed through the cleared area (hoping all the mines have been set off). In practice, the AVLM is usually followed by a tank or engineer vehicle equipped with a mine plow, roller, or flail, as the MICLIC typically fails to clear up to 50% of the mines in a lane.

The AVLM was a field modification first used during the 1991 Gulf War, and there were never any purpose-built AVLMs, though it was a common modification, and kits were built to allow the modification. The AVLM modification may be accomplished by 4 personnel with appropriate skills and equipment; normally, at least one person on the team must have the Mechanic or Combat Engineer skill, and must pass an Average test. The modification can be done in 2 hours by those four persons if they have a MICLIC trailer, basic tools, and a crane, whether ground or vehicle-mounted.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological

$250,593	D, A	400 kg	44.83 tons	2	21	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
111/78	25/15	1420	276	CiH	T6	TF1 TS1 TR1 HF52 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	2xMICLIC Launchers, M-2HB (C)	6xLine Charge, 525x.50

M-88 Hercules

Notes: This is the longtime standard armored recovery vehicle of the US Army, and to a far more limited extent, the Marines. It is also used by 19 other countries worldwide. It was in the process of being replaced by the M-88A2 and M-5 in US service and by the M-88A2 in some other countries, but large amounts of the M-88A1 were still in use in the Twilight War. The M-88A1 is described as a vehicle with something for every mechanic, from the wide selection of tools to a crane, and a very good heater, room for a recovered tank's crew, and even racks for things like an M-60 machinegun and antitank rockets. The M-88A1 carries basic, wheeled vehicle, tracked vehicle, small arms, and heavy ordinance tools, an air compressor, a welding and cutting set, and tow bars, ropes, chains, and cables. The crane may lift 22.7 tons when braced by the dozer blade, or 18.16 tons without using the blade. The main winch has a capacity of 39 tons, or double that with block and tackle. The auxiliary winch has a capacity of 1.9 tons.

The biggest difference between the base M-88 and the M-88A1 is that the M-88A1 is equipped with an 8.1 kW APU. The M-88A1 also has a fuel pump that allows the vehicle to pump fuel from an external source. Finally, the M-88A1 has a 19mm hydraulic impact wrench to assist in track maintenance of tracked vehicles.

The M-88A2 is a progressive development of the M-88A1. The general layout is similar to the M-88A1, but the M-88A2 adds armored side skirts, appliqué armor, stronger suspension, an upgraded engine, improved brakes, and more powerful winches. The M-88A2 is able to recover and tow a 70-ton vehicle at one-third speed, or a 30-ton vehicle at full speed. The M-88A2's crane can lift 35 tons, or 8.4 tons when not braced by the dozer blade. The main winch is capable of pulling 63.6 tons. Directly above the main winch is a lead winch (used to assist in deploying the main winch), which is itself able to pull 2 tons. The fuel pump is able to pump 95 liters per minute. This vehicle is outclassed by the M-5 but is much cheaper, and crews familiar with the M-88A1 can use it with ease.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
M-88	$109,420	G, A	3 tons	50.4 tons	4+4	19	Passive IR, WL/IR Spotlight	Enclosed
M-88A1	$140,454	D, A	3 tons	50.8 tons	4+4	19	Passive IR, WL/IR Searchlight	Enclosed
M-88A2	$157,128	D, A	3 tons	63.05 tons	4+4	23	Passive IR, WL/IR Searchlight	Shielded

Vehicle	Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
M-88	130/91	30/20	1514	581	Stnd	T6	HF7 HS5 HR4
M-88A1	107/75	25/15	1514	222	Stnd	T6	HF7 HS5 HR4
M-88A2	121/84	25/20	1628	389	Stnd	T6	HF10Sp HS7Sp HS5

Vehicle	Fire Control	Stabilization	Armament	Ammunition

(All)	None	None	M-2HB (C)	1500x.50

M-578 Light Recovery Vehicle

Notes: This vehicle is common in US units that still use the M-113 series as a primary vehicle. More commonly known as a VTR (Vehicle, Tracked, Recovery) to troops, the M-578 is a US-built recovery vehicle with a chassis as the M-107 and M-110 howitzers. The turret has a crane capable of lifting 13.6 tons. The VTR has an integral 10Kw generator, a rear mounted winch with 70m of cable capable of pulling 27 tons, and a dozer blade. The VTR has a driver's hatch on the front deck, commander's and mechanic's hatches on the turret deck, as well as doors on the turret sides and a double door on the rear of the turret. The M-578 can tow up to 35 tons, but is slowed to one-quarter movement at that weight.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$90,300	D, A	2 tons	24.3 tons	3	12	Active IR (Driver only)	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
119/83	25/20	1136	157	Trtd	T4	TF3 HS3 TR3 HF4 HS2 HR2

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C) (MAG (C) on British vehicles)	500x.50 (750x7.62mm on British vehicles)

M-728 CEV

Notes: This vehicle was designed soon after the M-60A1 main battle tank was taken into US service. It was not widely exported, and the only other countries to use it are Singapore and Saudi Arabia. The M-728 retains the base M-60A1 hull, but a new turret armed with a 165mm demolitions gun is mounted instead of the 105mm gun. This is a very stubby-barreled and short-range weapon, and its best use is to destroy fortifications and tank traps instead of as an antivehicle weapon. The normal M-60A1 commander's cupola is on top of this turret; also mounted on the turret is an A-frame crane with a capacity of 15.88 tons. The crane doubles as a winch, and has 61 meters of cable. At the front of the hull is a large dozer blade; this can be removed and replaced with a V-shaped mine plow.

Twilight 2000 Notes: Just prior to the Twilight War, the M-728 was being phased out of US service, thought to be overkill in a combat engineer role; however, a need for these vehicles was soon found again and they were drawn back out of the boneyards.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$218,654	D, A	700 kg	53.2 tons	4	21	Passive IR, WL/IR Spotlight	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
97/68	20/15	1420	277	Trtd	T6	TF45 TS17 TR13 HF56 HS12 HR8

Fire Control	Stabilization	Armament	Ammunition
None	None	165mm Demolitions Gun, MAG, M-2HB (C)	30x165mm, 3600x7.62mm, 600x.50

M-1059A3 Lynx

Notes: This was the US Army's standard smoke generation vehicle until adoption of the M-58 Wolf in the mid-1990s. Many of

these vehicles were sold to US allies and other countries using the M-113 base vehicle. The Lynx uses a tactical smoke generator of the 1986-1993 period type, with tanks twice as big as that of the standard tactical smoke generator. The generator and its tanks take up most of the room in the M-113 base vehicle that would normally be used for passengers, so no passengers may be carried.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
$125,695	D, A	300 kg	12.2 tons	3	7	Passive IR	Shielded

Tr Mov	Com Mov	Fuel Cap	Fuel Cons	Config	Susp	Armor
121/84	25/20/3	360	97	Stnd	T2	HF6 HS4 HR4

Fire Control	Stabilization	Armament	Ammunition
None	None	M-2HB (C)	2000x.50