

ARCHIVED REPORT

For data and forecasts on current programs please visit
www.forecastinternational.com or call +1 203.426.0800

Chinese Tracked Armored Personnel Carriers

Outlook

- PLA procurement of tracked APCs is in a transitional period
- Wheeled APC designs are increasingly prominent in the PLA force structure
- New, modular designs are likely to be introduced in the latter half of the forecast period

Orientation

Description. Tracked infantry combat vehicles.

Sponsor. The People's Liberation Army sponsors the development and PLA procurement of the vehicles covered in this report.

Licensees. None.

Status. Development through serial production.

Total Produced. Through 2014, we estimate the PRC produced 2,084 Type 85 series, 282 Type 90, and 1,700 Type YW 534 armored personnel carriers.

Application. Armored personnel carriers, optimized for transporting infantry during both offensive and defensive operations.

Price Range. In equivalent 2000 U.S. dollars, the Type 85 carries a unit price of \$297,000; the Type YW 534 carries a unit price of \$216,000.

In 2015 U.S. dollars, the baseline Type 90 reportedly maintains a unit price of \$325,704.

Contractors

Prime

**China North Industries Corp
(NORINCO)**

<http://www.norinco.com>, 12A Guang An Men Nan Jie, PO Box 2932, Beijing, 100053 China, Tel: + 86 10 6352 9988, Fax: + 86 10 6354 0398, Email: norinco@norinco.cn, Prime

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Services; Companies, Contractors, Force Structures & Budgets) or call + 1 (203) 426-0800. Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Chinese Tracked Armored Personnel Carriers

Technical Data

Note: *In this report, we focus only on those armored personnel carriers still in active PLA service – namely, the Type 85, the Type 90, and the Type YW 534.*

Crew. Two: commander and driver. The Type 85, Type 90, and Type YW 534 each carry 13 fully equipped infantrymen.

Armor. Conventional rolled homogeneous steel armor, providing protection against 7.62mm projectiles and ballistic fragments. The Type 90 can reportedly defeat 12.7mm rounds as well.

Design Features. All Chinese tracked armored personnel carriers are amphibious.



Type 85 Armored Personnel Carrier

Source: People's Liberation Army

Type 85 (YW 531H)

Dimensions. The following data reflect the basic Type 85 armored personnel carrier.

	<u>SI Units</u>	<u>U.S. Units</u>
Length	6.13 m	20.11 ft
Width	3.06 m	10.04 ft
Height	2.58 m	8.46 ft
Combat weight	13.6 tonnes	14.99 tons

Performance. The automotive performance data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	65 kmph	40.4 mph
Maximum water speed	7 kmph	4.3 mph
Maximum range	500 km	310.5 stat mi
Step	60 cm	1.96 ft
Trench	2.2 m	7.2 ft
Slope	40%	40%
Gradient	60%	60%
Fording	Amphibious	Amphibious

Chinese Tracked Armored Personnel Carriers

Engine. Deutz BF8L 413F four-cycle, air-cooled, supercharged diesel engine. This (apparently) license-produced powerplant generates 238.7 kilowatts (320 hp), with a power-to-weight ratio of 17.55 kilowatts per tonne (21.34 hp/ton). A 24-volt electrical system supports vehicle operations.

Gearbox. An unspecified manually operated gearbox, with one reverse and four forward gear ratios.

Suspension and Running Gear. Torsion bar suspension system, with five dual-tired roadwheels and three track return rollers on each side. The drive sprocket mounts to the front of the hull. Tracks are rubber-bushed double-pin type, with replaceable rubber track shoes/pads.

Armament. One pintle-mounted 12.7x107mm Type 54 machine gun with 1,120 rounds of ammunition.



Type 90 (YW 535) Armored Personnel Carrier

Source: People's Liberation Army

Type 90 (YW 535)

Dimensions. The following data reflect the basic Type 90 armored personnel carrier.

	<u>SI Units</u>	<u>U.S. Units</u>
Length	6.63 m	21.75 ft
Width	3.15 m	10.33 ft
Height	2.38 m	7.81 ft
Combat weight	14.4 tonnes	15.87 tons

Performance. The automotive performance data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	65 kmph	40.4 mph
Maximum water speed	7 kmph	4.3 mph
Maximum range	500 km	310.5 stat mi
Step	70 cm	2.29 ft
Trench	2.4 m	7.9 ft
Slope	30%	30%
Gradient	60%	60%
Fording	Amphibious	Amphibious

Chinese Tracked Armored Personnel Carriers

Engine. Same as the Type 85. The powerplant yields a power-to-weight ratio of 16.57 kilowatts per tonne (20.16 hp/ton) in the Type 90 application. A 24-volt electrical system supports vehicle operations.

Some versions of the Type 90 mount the more powerful Deutz BF8L 513C four-cycle, air-cooled, supercharged diesel engine. This powerplant generates 268.5 kilowatts (360 hp), with a power-to-weight ratio of 18.65 kilowatts per tonne (22.68 hp/ton).

Gearbox. Same as the Type 85.

Suspension and Running Gear. Torsion bar suspension system, with five dual-tired roadwheels and three track return rollers on each side. The drive sprocket mounts to the front of the hull. The first, second, and fifth roadwheel stations feature hydraulic shock dampers.

Armament. Same as the Type 85.



YW 534 Armored Personnel Carrier

Source: People's Liberation Army

Type YW 534

Dimensions. The following data reflect the basic Type YW 534 armored personnel carrier.

	<u>SI Units</u>	<u>U.S. Units</u>
Length	6.15 m	20.18 ft
Width	3.13 m	10.27 ft
Height	2.56 m	8.40 ft
Combat weight	14.3 tonnes	15.76 tons

Performance. The automotive performance data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	65 kmph	40.4 mph
Maximum water speed	6 kmph	3.7 mph
Maximum range	500 km	310.5 stat mi
Step	70 cm	2.3 ft
Trench	2.5 m	8.2 ft
Slope	40%	40%
Gradient	60%	60%
Fording	Amphibious	Amphibious

Engine. Same as the Type 85. The powerplant yields a power-to-weight ratio of 16.69 kilowatts per tonne (20.30 hp/ton) in the Type YW 534 application. A 24-volt electrical system supports vehicle operations.

Gearbox. Same as the Type 85.

Suspension and Running Gear. Same as the Type 90.

Armament. Same as the Type 85. The Type YW 534 carries 1,100 rounds of 12.7x107mm ammunition.

Chinese Tracked Armored Personnel Carriers

Variants/Upgrades

Variants. The PRC State Arsenal system has developed a number of variants based on the Type 85, Type 90, and Type YW 534 armored vehicle chassis. The following table summarizes the available variants.

<u>Designation</u>	<u>Description</u>
WZ 751	Type 85-based Armored Ambulance. Features raised rear hull and larger commander's cupola. Carries a four-man crew, with four litters or eight seated patients.
WZ 702	Type 85-based Armored Command Post. Carries two-man crew plus six-man staff. Features an auxiliary power unit, additional ventilation equipment, and additional communications equipment.
Type 85 ACV	Armored Command Vehicle. Variation of WZ 702, with same crew/staff capacity.
Type 85 ACPV	Artillery Command Post Vehicle, with turret and raised rear superstructure. Similar to Type 85 ACV in terms of crew/staff and equipment; optimized to support 155mm PLZ45 self-propelled howitzer package.
Type 85	82mm Self-Propelled Mortar. Carries seven-man crew and 120 rounds of 82mm ammunition.
Type 85	120mm Self-Propelled Mortar. Carries six-man crew and 50 rounds of 120mm ammunition.
Type 85 ARV	Armored Recovery Vehicle. Features a hydraulic crane on the left side of the hull, a generator, a boom, and other recovery/maintenance equipment.
Type 85	122mm Self-Propelled Howitzer. Mounts Chinese version of Russian D-30 ordnance.
Type 85 MEV	Maintenance Engineering Vehicle. Similar to the Type 85 ambulance in configuration; equipped like the Type 85 ARV.
Type 85/RO 120	A proposed version of the Type 85 integrating BAE Systems 120mm breech-loaded mortar on a turntable. Would carry 66 rounds of 120mm ammunition.
YW 309 MICV	Type 85-based Mechanized Infantry Combat Vehicle.
Type 90 IFV	Type 90 Infantry Fighting Vehicle.
Type 90	Type 90-based Armored Ambulance. An air-conditioned ambulance that can carry four litter patients.
Type 90	82mm Self-Propelled Mortar. Features a turntable-mounted 81mm or 82mm mortar; carries 112 rounds of mortar ammunition.
Type 90	120mm Self-Propelled Mortar. Carries 50 rounds of 120mm ammunition.
Type 90 ARV	Armored Recovery Vehicle. Features a hydraulically operated crane, an electric generator, and welding equipment.
Type 90 ACV	Armored Command Vehicle. Features a 10-meter (32.08-ft) antenna, a generator, and a communications suite.
Red Arrow 8	Type 90-based Red Arrow 8 ATGM platform. Features a raised rear roof mounting a launcher for four Red Arrow 8 anti-tank guided missiles. Carries an additional 12 missiles in reserve.
Type 90	122mm Self-Propelled Howitzer. Mounts a modified Chinese version of the Russian D-30 howitzer. This proposed version of the Type 90 would be based on a longer chassis, with six roadwheels and a more powerful version of the BF8 413F engine.
Type 90 MLRS	130mm Multiple Launch Rocket System. Mounts 30-round launcher on vehicle roof.
Red Arrow 8	YW 534-based Red Arrow 8 ATGM platform.
YW 307	Type YW 534-based Mechanized Infantry Combat Vehicle.

Chinese Tracked Armored Personnel Carriers

Program Review

Background. Since the early 1980s, the People's Republic of China has been striving to become a major player in the international combat vehicle market. This effort has largely involved producing licensed and unlicensed copies of various foreign designs, most notably designs originating in the former Soviet Union.

Regardless of the design origins, the PRC State Arsenals, under the auspices of the China North Industries Corporation (NORINCO), has grown into the stalking tiger of the international market. The PRC State Arsenals system, combined with the aggressive marketing strategies of NORINCO, possesses at least the potential to significantly impact the status quo of the international market.

PLA Standardizing Its Inventory

The People's Liberation Army is currently working toward standardizing its active armored personnel carrier inventory, with the Type 90 as the basis. Though the Type 85 and the YW 534 will likely remain in active inventory throughout the forecast period, the PLA clearly intends to phase out the earlier Type 63 and Type 77 armored personnel carriers.

Whether these surplus (and probably worn-out) Type 63 and Type 77 vehicles will surface on the international market remains open to speculation. As more Type 90 APCs enter PLA service, the Forecast International Weapons Group expects that existing Type 85 and YW 534 vehicles will become major export offerings from NORINCO.

The Current Active Inventory

Type 85. This vehicle, originally bearing the designation YW 531 H, represents a direct follow-on to the Type 63 APC. The Type 85 is almost identical to the YW 534 (see below), but the left side of the Type 85 features no smoke grenade launchers, firing ports, or vision blocks. The Chinese have developed this versatile design into at least 13 variants, including the Artillery Command Post Vehicle component of the 155mm PLZ45 self-propelled artillery system.

For more information on the PLZ45 system, see the "Type 88 (PLZ45) 155mm Self-Propelled Howitzer" report in the *Ordnance & Munitions Forecast*.

Myanmar and Thailand have purchased the Type 85 APC; Kuwait has purchased the Artillery Command Post Vehicle as part of the PLZ45 package.

Type 90. As mentioned above, the PLA is currently standardizing its active APC inventory around the Type 90 family of vehicles. To date, the Chinese have

developed 11 variants of this design. The Type 90, also known as the YW 535, shares some components with the earlier Type 85. However, the Type 90 features a lower, wider hull and improved automotive components. The vehicle can mount two engine options, as discussed in the **Technical Data** section of this report.

The Type 90 exhibits a conventional interior layout. The driver sits in the left-front of the hull; the engine compartment occupies the right-front. The driver's station features a single-piece hatch cover and three day periscopes; the center periscope is interchangeable with a passive night vision device. The driver employs a yoke-type steering wheel for directional control. The commander's cupola and a shielded, pintle-mounted 12.7x107mm Type 54 machine gun mount at the center of the hull. In addition, four smoke grenade launchers mount on each side of the hull.

In the rear troop compartment, a large side-swinging rear door (hinged on the right) provides primary troop access/egress. Four roof-mounted hatch covers (two forward circular hatches, two rearward rectangular hatches) provide secondary access/egress. The troop compartment features three firing ports with periscopes along each side of the hull.

The Type 90 is fully amphibious, employing its tracks for water propulsion. The diesel fuel tanks mount externally, on either side of the rear troop door.

Type YW 534. This tracked vehicle is essentially an improved version of the Type 85. The vehicle exhibits an interior layout similar to the Type 90, with the driver in the left-front of the hull and the engine compartment in the right-front. The driver's station features a single-piece hatch cover and three day periscopes; the center periscope is interchangeable with an infrared night driving device. The commander occupies a position immediately behind the driver; the commander's station features a single-piece hatch cover with an integral day vision block.

On the YW 534, the pintle-mounted 12.7x107mm Type 54 machine gun is located above the forward part of the troop compartment; one of the infantrymen acts as gunner. Each side of the hull features four electrically operated smoke grenade launchers.

In the rear troop compartment, a large side-swinging rear door (hinged on the right) provides primary troop access/egress. This door features a firing port and a day vision block. The YW 534's troop compartment, like that of the Type 90, features four roof-mounted hatch covers (two forward circular hatches, two rearward

Chinese Tracked Armored Personnel Carriers

rectangular hatches). The number and placement of firing ports vary between YW 534 variants. However, the standard configuration appears to feature two firing ports with periscopes along the left side of the troop compartment, and three to four firing ports with periscopes along the right side.

Common Standard Features

Like the Type 85 and Type 90, the YW 534 is fully amphibious, employing its tracks for water propulsion. The YW 534 also features a nuclear, biological, and chemical (NBC) protective suite as standard equipment. Standard communications gear consists of the Type 803 intercommunications set and Type 889 radio.

Related News

China Delivers 709 Vehicles to the Ecuadorian Armed Forces – The Ecuadorian armed forces recently received 709 vehicles purchased from China. The vehicles were handed over on April 7 during an official ceremony held at the Huancavelica military fort in Guayaquil.

The purchase was valued at EUR81 million (\$89 million) and included trucks, tankers, vans, buses, dump trucks, two mechanized bridges, and spare parts.

More specifically, the delivery included 226 multipurpose 4x4 trucks, 93 multipurpose 6x6 trucks, 18 6x4 water tankers, 20 6x4 fuel tankers, 27 30-ton vehicles with attached trailers, 35 22-ton trucks, 20 5-ton vans, 99 3.5-ton multipurpose trucks, 62 45-passenger buses, 98 28-seat micro buses, and 11 12-cubic-meter trucks.

The new equipment is intended to be used for evacuation, rescue, protection, and assistance purposes during natural disasters. The vehicles are to be distributed among several military units throughout the country. (*Info Defensa*, 5/15)

Venezuela's Naval Infantry Contingent Receives First Batch of NORINCO VN1 8x8 IFVs – The Venezuelan Navy's Marine contingent inducted its first batch of VN1 8x8 wheeled armored vehicles into active service December 29, 2014, after the vehicles' successful delivery from China's state defense contractor, NORINCO.

The delivery is the first step toward a broader modernization and reorganization of the Venezuelan Marines launched by the Navy in cooperation with Chinese defense contractors in 2012.

The \$500 million contract signed that year encompassed the procurement of both surplus and new-build Chinese amphibious vehicles by the Venezuelan Navy, as well as extensive aid from NORINCO in the modernization of the Marines' aging vehicle stocks.

Although not confirmed, reports by FAV-CLUB and official statements of the Venezuelan Navy indicate that the service also intends to acquire NORINCO VN16/VN18 amphibious assault vehicles and an array of other systems. The initial VN1 batch also included the delivery of a number of Chinese logistics vehicles.

VN1 is NORINCO's export designation for what is referred to domestically as the ZBL-09. The 8x8 wheeled armored vehicle is available in an array of variants, with the most prominent being the APC and IFV models. Visual evidence suggests that Venezuela primarily acquired the variant outfitted with a one-man turret and 30mm automatic cannon, with a smaller number of APC models lacking turrets. (FAV-CLUB, 1/15)

Market Intelligence Service Subscribers: For additional news, go to the on-line E-Market Alert page located in the Intelligence Center at www.forecastinternational.com and click on the links to the products you subscribe to.

Funding

The People's Republic of China Ministry of National Defense, through the People's Liberation Army, funds the development, production, and PLA procurement of armored personnel carriers.

Chinese Tracked Armored Personnel Carriers

Timetable

<u>Year</u>	<u>Major Development</u>
1968	Start of development of YW 531/Type 63 carrier
1970s-80s	State Arsenal develops and produces several additional indigenous designs
1974	First foreign observation of Type 77
1991	PLA reveals Type 90 program
2015	PLA tracked APC procurement in transitional period; production and development of an array of armored vehicle platforms ongoing

Worldwide Distribution/Inventories

Export Potential. While the People's Republic of China continues to pursue its quest of becoming a major player on the international market, NORINCO has not yet widely exported the Type 85, Type 90, or YW 534 armored personnel carriers. In fact, the Chinese industrial base has thus far been hard-pressed to meet PLA requirements. Nevertheless, we expect surplus Type 85 and YW 534 vehicles will eventually attain the moderate success of earlier models in terms of regional export sales as the PLA standardizes its active inventory around the Type 90.

Press reports indicate that Myanmar may have taken delivery of 55 Type 90 vehicles of unspecified build. Foreign military sales by Chinese defense contractors often go unreported by both the receiving parties and the press, and such sales are often remain unconfirmed until the vehicles appear in the field or other public settings.

Countries. The following countries maintain Chinese armored personnel carriers of some version in inventory: **Albania** (103 Type YW 531); **Australia** (1 Type YW 531); **Bangladesh** (50 Type 85, unconfirmed); **Democratic People's Republic of Korea** (500 Type YW 531); **Democratic Republic of the Congo** (12 Type YW 531); **Ethiopia** (12 Type YW 534); **Iraq** (142 Type YW 531); **Myanmar** (200 Type 85, 55 Type 90); **People's Republic of China** (1,531 Type 85, 1,874 Type 63, 898 Type 77, 1,670 Type YW 534, 282 Type 90); **Sri Lanka** (30 YW 534); **Sudan** (40 Type YW 531); **Tanzania** (30 Type YW 531); **Thailand** (782 Type 85); and **Vietnam** (132 Type YW 531).

Forecast Rationale

The People's Liberation Army is currently pursuing an ambitious program to modernize its armored personnel carrier inventories through the acquisition of a broad range of new vehicle designs.

Over the course of the 1990s and early 2000s, the acquisition of the Type 89/90 APC played an important role in instituting a higher level of standardization across China's vast APC fleet by pooling resources into the procurement of a common platform, and contributed to greatly expanding the overall mechanized capabilities of the People's Liberation Army Ground Force (PLAGF).

Nevertheless, the vast numerical requirements of the PLAGF's armored fleet will necessitate that many of the service's aging Type 63 and Type 85 APCs remain in active service through the forecast period in order to maintain peak operational readiness.

At time of writing, the PLAGF's most pressing operational requirements in the mechanized sphere are adequately fulfilled by its existing stocks of Type 89/90 and older Type 85 APCs. As a result, the Chinese

Ministry of National Defense and the PLAGF have greatly decelerated the scale and pace of tracked APC procurement over the past several years.

The Chinese military is now pursuing a procurement strategy that emphasizes the targeted acquisition of more thoroughly modern armored vehicles in moderate quantities, rather than the large-scale production of somewhat dated platforms that has traditionally defined China's approach to armored vehicle procurement.

Although the Type 90 APC once appeared to be a contender to become the new standard for Chinese APCs, the PLAGF now appears to have postponed any effort to overhaul its APC fleet on a massive scale until a more state-of-the-art APC platform can be developed.

Newer armored vehicle designs such as the ZBD-04 / ZBD97 tracked IFV and ZBL-09 8x8 wheeled IFV/APC arguably represent the future of Chinese armor. These new vehicle series derive significant design inspiration from contemporary Russian and Western-European armored vehicles, such as the BMP-3 IFV and

Chinese Tracked Armored Personnel Carriers

MOWAG/General Dynamics European Land Systems Piranha, respectively.

Although the scale on which the PLAGF is procuring these vehicles is still rather considerable by international standards, the service remains dedicated to experimenting with a broad array of armored vehicle designs rather than committing to any individual platform that might serve as the pillar of a more standardized armored vehicle fleet.

However, we anticipate that the PLAGF's procurement strategy will begin to coalesce around a smaller selection of modular armored vehicle platforms as the forecast period enters its latter stages.

Limited Export Potential

Over the past several years, NORINCO has begun to reorient much of its marketing largess toward the sale of its more recent and more advanced vehicle designs.

Notable products include both tracked armored vehicles such as the VN11/ZBD97 IFV and an increasingly

significant quantity of wheeled designs such the WMZ 551 and 8x8 ST1 and VN1 series.

Nevertheless, the sale of surplus Type 85, and YW 534, stocks to customers in the Middle East, Africa and Asia is likely to remain a modestly lucrative venture for the contractor through the forecast period and beyond.

For cash-strapped customers seeking to enhance the capabilities of their mechanized forces in a manner commensurate with both their fiscal realities and pressing operational requirements, the acquisition of simple but inexpensive vehicles like the Type 85 or YW 534 is often the most ideal and most feasible solution.

Although these types of contracts might lack the prestige associated with the sale of newer products, they will continue to play an important role in NORINCO's multifaceted approach to the export market through the forecast period.

* * *