Appendix  E

ARMORED VEHICLE RECOGNITION

Because the majority of Chaparral, Vulcan, and Stinger units, at times, are providing ADA protection to forward maneuver units, their proximity to enemy ground troops and equipment necessitates that their personnel be familiar with some of the enemy materiel. Vulcan and Stinger elements will more than likely be exposed to enemy ground fires and, in fluid situations, may encounter advance elements of enemy ground units.

Unless we understand the capabilities of threat weapon systems, their patterns of employment, and their doctrine, we cannot counter their moves effectively.

This appendix presents threat ground vehicles and problems of recognition. It also presents the principal armored vehicles which are most likely to be encountered by forward area ADA platoon personnel.

The scope of this appendix limits the amount of ground threat materiel which can be discussed; however, a complete unclassified discussion of threat operations, tactics, and equipment is found in FMs 100-2-1, 100-2-2, and 100-2-3.

RECOGNITION OF ARMORED VEHICLES

Recognition training is an important part of the overall training program in ADA units. All soldiers who are likely to be in forward areas should be able to recognize, in addition to aircraft,

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E-1
MBTs, armored cars, and APCs of NATO and Warsaw Pact countries.

For most soldiers, recognition of ground equipment is not a serious problem as they are usually told what threat equipment is in their location and should be told when to fire at them. There will be occasions when unexpected vehicles appear and when the soldier must himself make the decision as to whether it is hostile or friendly.

Soldiers in the forward area must be able to detect and identify equipment which may be camouflaged and is often at ranges out to 3,000 meters.

While recognition training methods and techniques are beyond the scope of this appendix, several aids are mentioned here. Among those aids are film clips, video tapes, slides, and viewgraphs. While photographs, posters, and slides continue to be used, consideration should be given to developing skills in the recognition of moving vehicles. Scale models of vehicles can also be used for this training. Such minor details as caliber of the main armament and the subcaliber machine gun, number of crew members, and cruising range should not be emphasized. When one looks at an actual vehicle at 2,000 meters from a full side view, how many details can be seen? Is the caliber of the main armament a key recognition feature? The instructor should have realistic slides of equipment — side view, oblique, and head-on — at ranges from 500 to 3,000 meters. The instructor should determine what the key recognition features are. For instance, older US tanks viewed head-on at 300 meters look as tall as they are broad. These tanks are instantly distinguishable from modern Russian tanks because of this feature. This aspect ratio could be a key recognition feature. Head-on comparisons of five MBTs (see the Main Battle Tanks Comparisons illustration) show overall aspect ratio and it can be readily seen that the shape of the turret is one of the key recognition features.

Note: The illustrations in this appendix are not drawn to scale.

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**MAIN BATTLE TANKS COMPARISONS**

- M60
- LEOPARD
- T-72
- CHIEFTAIN
- AMX-30
TURRETS

Turrets are streamlined, elongated, and usually well sloped. Turret overhangs and bulges are common. Some representative turrets are shown in the Types of Turrets illustration.

TYPES OF TURRETS

ARMAMENT

The armament of armored vehicles ranges from machine guns up to large cannons. The armament of tanks usually consists of a main gun, coaxial machine gun, and an antiaircraft machine gun.

Two recognition features of the main gun, as shown in the Main Gun Features illustration, are muzzle brakes and bore evacuators.

MAIN GUN FEATURES
HATCHES AND CUPOLAS

The type of hatch or cupola on top of the turret, as shown in the Types of Hatches and Cupolas illustration, is another good recognition feature. Warsaw Pact vehicle hatches are located differently from most allied vehicles.

TYPES OF HATCHES AND CUPOLAS

The hatches of Warsaw Pact vehicles open toward the front. The hatches on the majority of allied vehicles open toward the back.

TRACK AND SUSPENSION SYSTEMS

Many vehicles may be recognized by their track and suspension systems. Recognition of these features may be difficult, however, due to obscuration by brush or defiladed terrain. The Tracks illustration contains examples of suspension systems.

TRACKS

FLAT TRACK

SUSPENDED TRACK

SUPPORT ROLLERS
ROAD WHEELS

The flat track is utilized on such vehicles as the Russian T-72, the American M551, and the American M113 (see the Suspension Systems illustration). On this type of suspension system, the track returns along the top of the road wheels. The suspended track with support rollers for track return is utilized on such vehicles as the American M60A1, British Centurian, and the Russian T-72. Another recognition feature of suspension systems is the spacing between road wheels. The majority of Warsaw Pact vehicles have definite gaps between road wheels, whereas the majority of allied vehicles have evenly spaced road wheels. The Suspension Systems illustration contains some representative examples of different suspension systems.
The major recognition features of these vehicles (see the Armored Personnel Carriers Recognition Features illustration) are the shape of the hull, suspension (wheeled or tracked), and the cupola or turret. Many allied vehicles are characterized by a boxy or square-shaped hull. Most Warsaw Pact vehicles are characterized by a low, angular, or boat-shaped hull.
LIGHT ARMORED VEHICLES

The principal threat armored vehicles most likely to be encountered by SHORAD Units are described in the following paragraphs. Principal physical characteristics, which aid visual recognition, are also described to facilitate engagement by SHORAD units.

ARMORED INFANTRY COMBAT VEHICLE, BMP

Because of its relatively large numbers on the battlefield and its firepower and mobility capabilities, the BMP (see the BMP illustration) is probably the most dangerous ground weapon system to SHORAD gun survivability besides tanks.

Due to the compactness of the BMP, critical components (see the Areas of Vulnerability illustration on [page E-8]) such as ammunition, fuel, and personnel are located in such a manner that penetration anywhere on the vehicle will normally result in a mobility or personnel kill. Fire should therefore be concentrated on the vehicle's areas of vulnerability.
AREAS OF VULNERABILITY

AMPHIBIOUS COMBAT VEHICLE, BMD

The BMD (see the BMD illustration) is found in threat airborne divisions. BMD armament is the same as the BMP except for two low-mounted 7.62-millimeter machine guns. The vehicle has a combat weight of only 7.5 metric tons and can attain a speed of 60 kilometers per hour.
AMPHIBIOUS SCOUT CAR, BRDM

The BRDM armored reconnaissance car weighs about 5.6 metric tons and can attain a speed of 80 kilometers per hour (see the BRDM illustration, this page). The BRDM-2 weighs 7.0 metric tons and can attain a speed of 100 kilometers per hour (see the BRDM-2 illustration, this page and the BRDM-2 Antitank Guided Missile Carrier illustration [page E-10]).
BRDM-2 ANTITANK GUIDED MISSILE CARRIER

BRDM CHARACTERISTICS

LIMITATIONS
Maximum armor 10-millimeter (BRDM) and 14-millimeter (BRDM-2), (Penetrable by artillery fragments and 50-caliber machine gun fire), Tires vulnerable to small arms, Missile leaves highly visible signature when fired.

14.5-MILLIMETER ANTIAIRCRAFT MACHINEGUN
Has maximum ballistic capability of 350 meters, with effective range of 1,000 meters and armor penetration of 8 millimeters at 0° at 500 meters. Rate of fire: 200 to 250 rounds par minute (practical).
AMPHIBIOUS ARMORED PERSONNEL CARRIER, BTR

The BTR series of armored personnel carriers are described in the following paragraphs.

**BTR-60PB**

This vehicle (see the BTR-60PB Example illustration) is the standard APC in motorized rifle units. It performs well cross-country in conditions that favor wheels. The boat-shaped hull with sloped sides provides good swimming capability and helps deflect hostile fires.

**BTR-60PB EXAMPLE**

![BTR-60PB Example Illustration]

**BTR-70**

This vehicle (see the BTR-70 Example illustration) is a successor to the BTR-60PB. Both vehicles have the same turret armament. Like the BTR-60PB, the BTR-70 has good cross-country capability, high road speed, and large troop-carrying capacity. Its versatility and amphibious capability are also advantages.

**BTR-70 EXAMPLE**

![BTR-70 Example Illustration]
Tank recognition is of primary importance to SHORAD personnel. It is too late if a SHORAD crew mistakenly identifies hostiles as friendlies. Recognition features and characteristics of threat tanks are shown in the following illustrations.

**RECONNAISSANCE TANK, PT-76**
Formerly the standard reconnaissance tank, the PT-76 is being replaced by BMP reconnaissance vehicles. See the PT-76 Tank illustration.

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**PT-76 TANK**

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**MEDIUM TANK, T-62**
The medium tank T-62 is found in some motorized rifle and tank units. See the T-62 Tank illustration.

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**T-62 TANK**

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Note: Auxiliary fuel tank on rear deck not shown.
MAIN BATTLE TANK, T-64

The T-64 (see the T-64 Tank illustration) is a successor to the T-54/55/62 series battle tanks. The T-64 is being deployed in GSFG and Western Military Districts in the Soviet Union. It has not appeared outside of Soviet units.

T-64 TANK

Note: Auxiliary fuel tank on rear deck not shown.

MAIN BATTLE TANK, T-72

The T-72 is a successor to the T-54/55/62 series battle tanks. The T-72 (see the T-72 Tank illustration) is employed in the Soviet Union and has been introduced in Warsaw Pact countries and some Middle East countries. It employs armament, ammunition, and fire control similar to the T-64.

T-72 TANK
ANTIAIRCRAFT ARMORED VEHICLES

Tracked and wheeled antiaircraft vehicles which provide close-in protection for threat maneuver formations are deployed well forward and may conceivably be encountered by our SHORAD units.

TRACKED ANTIAIRCRAFT WEAPON, ZSU-23-4

This self-propelled weapon is replacing the ZSU-57-2 in some units. The ZSU-23-4 (see the ZSU-23-4 illustration) is employed in the air defense battery of motorized and tank regiments as well as for security for SA-4 (GANEF) and SA-6 (GAINFUL) SAM units. Its secondary mission is engagement of ground-type targets.

ZSU-23-4

TRACKED ANTIAIRCRAFT GUN, ZSU-57-2

This self-propelled weapon (see the ZSU-57-2 illustration) is used by the Soviet Union and Warsaw Pact armies. It is found in air defense regiments of tank and motorized rifle divisions.

ZSU-57-2
SHORT-RANGE AIR DEFENSE SYSTEM, SA-9

The low-altitude air defense system SA-9 (GASKIN) is found in the antiaircraft battery of motorized rifle and tank regiments. See the SA-9 (GASKIN) illustration.

SA-9 (GASKIN)

Short-range, low-altitude air defense system found in the antiaircraft battery of motorized rifle and tank regiments.

Modified BRDM — 2 chassis.
Four missile canisters carried on rotatable launcher turret.

Missile: infrared seeker.
high-explosive warhead.
Slant range: 7 kilometers.
Kill zone: 65-15,500 feet.
Crew: 4
Amphibious.

Note: The SA-9 can be utilized to complement the ZSU-23-4.