Московский государственный технический университет
имени Н.Э. Баумана

Учебно-методическое пособие

Т.Т. Савина

Обучение чтению литературы на английском языке по специальности «Многоцелевые гусеничные машины»

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Пособие содержит оригинальные тексты на английском языке, а также задания и упражнения, позволяющие овладеть необходимой лексикой, развить навыки понимания и перевода научно-технической литературы.

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Редактор *Н.М. Маслова*
Корректор *М.А. Василевская*
Компьютерная верстка *Е.В. Зимакова*

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ПРЕДИСЛОВИЕ

Пособие, состоящее из трех разделов, включает оригинальные тексты на английском языке, задания и упражнения, позволяющие развить навыки понимания и перевода научно-технической литературы. Лексико-грамматический материал подобран так, чтобы студенты могли усвоить лексику, необходимую для перевода публикаций по специальности и обсуждения профессиональных тем с иностранными коллегами.

Сразу после основного текста, отмеченного буквой *A*, в каждом разделе помещен словарь, содержащий главным образом специальные термины. Дополнительные тексты студенты не только переводят (в том числе без словаря), но и реферируют.

Пособие предназначено для студентов старших курсов, обучающихся по специальности «Многоцелевые гусеничные машины».

UNIT 1

TASK 1. *Read the text, translate into Russian and write 7–8 sentences denoting the main points of the article.*

Text 1A. Updating the M1 tank

The American M1 *Abrams* battle tank, in production since 1980, stands out, together with the German *Leopard 2*, among the latest generation of tanks.

The improved M1, built as an update, is armed with the same 105 mm gun as the basic version, but has been updated in several other areas. These improvements concern, in particular, the ballistic protection and the running gear. In anticipation of the different gun mount required for the 120 mm gun, the improved M1 is fitted with the same trunnions as the M1A1. These more compact, cast-steel trunnions are considerably easier to produce than the M1's forged trunnions.

In the improved M1 and M1A1, the resolvers (moving rod-shaped sensors which detect the relative movements of the gun cradle and pass these measurements on in the form of electrical impulses to the fire control system) are built into the mantlet, to the rear of the trunnions. They are therefore within the turret, significantly simplifying maintenance and adjustment and enhancing survivability. Previously, the main gun had to be removed before a damaged or defective resolver could be replaced.

Since August 1984, M1's have been fitted with a redesigned driver's instrument panel. The panel has a new speedometer for the new final drive, and an additional warning light to indicate when both primary and secondary filters are clogged. The hold-down fixture for the driver's hatch when in the open position has been modified to make it more robust. One effect of these modifications has been to make the Improved M1 900 kg heavier than the M1, thus reducing maximum speed from 72.4 to 66.8 km/h. Another model M1A1 has been in production since 1985.

The M1A1's main armament is the *Leopard 2*'s 120 mm smoothbore gun with vertical sliding breech manufactured under licence. In order to fit the new gun, it was necessary to redesign completely the mantlet and the trunnions bearings. The larger caliber has an effect on

the number of rounds which can be carried. In the turret bustle, only 34 120 mm rounds can be stowed, as opposed to the 44 105 mm rounds in the M1, while the capacity of the rear-hull ammunition compartment is reduced from eight to six rounds. The ammunition compartment has been fitted with new, vibration-absorbing racks since, with the old ones, there was a tendency for the cartridge cases or the racks themselves to break.

In the M1A1 all the ammunition is stowed under separate armour. In the event of a hit on the ammunition compartment, the pressure of the explosion is released through blow-off panels in the turret roof. Furthermore, both ammunition compartments have anti-fratricide systems (plastic rods and bars positioned to isolate each round in its rack) and the hull ammunition compartment has, in addition, a polyethylene liner.

Thus if one round is detonated, a chain reaction is prevented. Crew protection is further increased by improved armour on the mantlet and the front of the turret.

Also new is the weapon mount and ammunition-feed system for the 7.62 mm coaxial machine-gun. Although the number of rounds carried for this weapon has been reduced from 4,800 to 2,800, the feed chute has been relocated to clear the breech of the 120 mm gun.

The manual turret-traversing mechanism now has a two-speed drive (10 mils and 5 mils per turn), rather than the single-speed system (10 mils per turn) previously fitted. The manual gun-elevation drive has been changed from 8 to 5 mils per turn.

To make it easier to check the oil level in the turret-traversing mechanism, a plastic inspection plug has been added.

The crew guards in the fighting compartment have been improved. The commander has an arm and a foot guard in addition to his original knee guard. The loader's shoulder guard has been redesigned so that it can give the loader more room during re-ammunitioning.

Essential Vocabulary*

stand out *v* – выделяться, выгодно отличаться

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* Во всех разделах пособия слова, вошедшие в *Essential Vocabulary*, даны в том порядке, в котором они встречаются в основных текстах, отмеченных буквой *A*. Здесь и далее даны те значения слов, которые нужно знать, чтобы перевести эти тексты на русский язык.

update *v* – модернизировать
running gear – ходовая часть
mount *n* – крепление, опора
cast-steel – литая сталь
trunnion *n* – подвеска; ось качения или поворота
resolver *n* – решающий прибор
gun cradle – люлька орудия
mantlet *n* – защитная сетка, прикрытие
turret *n* – орудийная башня
maintenance *n* – техническое обслуживание
enhance *v* – усиливать
survivability *n* – сохранение боеспособности
final drive – бортовая передача
clog *v* – закупоривать
hold-down fixture – зажимное приспособление
robust *a* – прочный, жесткий
smoothbore – гладкий канал ствола
sliding – двигающийся
breech *n* – казенная часть ствола
bearing *n* – подшипник
round *n* – патрон, выстрел
rack – рама, каркас
cartridge case – патронная гильза
stow *v* – укладывать
rear hull – задняя часть корпуса
blow off panel – спускная панель
anti-fratricide *a* – противовзрывное
liner *n* – лайнер, внутренняя труба
feed chute – загрузочный лоток
traverse *v* – двигаться, перемещаться
plug *n* – пробка
guard *n* – упор, ограничитель
room *n* – место, пространство
ammunitioning – загрузка боеприпасов

TASK 2. *Translate the noun groups. Use a dictionary if necessary.*

A knee guard, a foot guard, a two-speed drive, a gun-elevation drive, a weapon mount, crew protection, the turret roof, the hull ammunition compartment, trunnion bearing, cast-steel trunnions, rod-shaped

sensors, the fire-control system, a smoothbore gun, a chain reaction, a single-speed system.

TASK 3. *Translate the sentences into Russian paying attention to Participle and Gerund.*

1. South Africa has started manufacturing image-intensification devices using second-generation tubes with automatic gain control.
2. The binocular eyepiece[1] permits viewing with both eyes simultaneously while allowing free head movement for instrument observation.
3. The gunner has an image intensifier, ranging being carried out using a hand laser.
4. While not wishing to use the entire battle tank fleet, the Defence Force set up a mobile force for conducting conventional operations.
5. The compact laser rangefinder[2] can be used when firing missiles and anti-tank weapons.
6. The Tank Breaker program was started in 1989 using technology previously developed under the Advanced Research Agency programme.
7. Two captive seekers[3] were tested, these trials[4] being the first in this field.
8. Both seekers tested successfully tracked tanks and air targets.
9. Production of the *Challenger 2* main battle tank is under way, with the first 20 delivered to regiments.
10. A microprocessor-based controller compares the outputs of several trackers, thus decreasing the system's sensitivity to countermeasures.
11. This turreted vehicle already possessing automatic loading and the ability to fire on the move, some modifications could be made without much difficulty.
12. Driving from the turret could be introduced and this might lead to eliminating the hull driver.
13. In the event of an explosion the pressure is released upwards thus protecting the crew in the fighting compartment.

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[1] Окуляр.
[2] Дальномер.
[3] Самонаводящиеся снаряды.
[4] Испытания.

14. The improved M-1 version has two air shafts, one being mounted on the left-hand side over the heater.

15. This model has 12 air-cooled cylinders in two banks[1], each bank having its own turbo-supercharger.

TASK 4. *Translate the text.*

Text 1B. Army Programmes

As far as army systems are concerned, high in the priority list is the combat effectiveness improvement of the *Leopard 2* MBT. The programme includes measures aimed at increasing the survivability and degree of control of the *Leopard 2* weapons system. As such, the tank will be equipped with additional protection on the front and flanks of its turret, while in a significant step towards improving the degree of control, the commander is being provided with his own thermal imaging device integrated into the periscope. The combat effectiveness improvement package has been developed jointly with the Netherlands and Switzerland, which also use the *Leopard 2*.

As regards the Bundeswehr, a total of 225 tanks are going to be converted to the new configuration. The first of these will be delivered to the troops in September of this year; the programme will then continue with the last vehicle being delivered at the end of the year.

Germany's decision to proceed with the programme certainly exerted a positive influence over Sweden's choice of the *Leopard 2* as the new MBT for the Swedish Army. In an initial expansion phase, Sweden has placed an order for 120 new-construction tanks, and 29 of these will be assembled in Germany and 91 in Sweden. Co-production with Swedish firms has already begun.

TASK 5. *Answer the questions.*

1. What are the most important points in the improvement of the *Leopard 2* MBT?
2. Where will addition protection be fitted?
3. In what way will the degree of control be improved?
4. What countries took part in the programme?
5. How many tanks in the Bundeswehr will be renovated?
6. Why did Sweden choose the *Leopard 2* as the new MBT?

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[1] Блоки.

TASK 6. *Translate into Russian in writing. Pay attention to Passive forms of the predicates.*

Text 1C. Engine and transmission

The final drives have been modified in a number of respects to make them more rugged. Several moving parts have been strengthened and the input, output and O-ring seals improved. In addition, the planetary-gear set ratio has been changed from 4.30:1 to 4.67:1.

The transmission itself has undergone various modifications, both externally and internally, to correct defects which had become apparent in the M1. Externally, an oil-filter by-pass switch has been fitted so that, if the primary oil filter becomes clogged, oil is transferred to the secondary filter. At the same time, a warning light is activated on the driver's instrument panel. If both filters become clogged, the transmission continues to operate using unfiltered oil. Also fitted on the driver's instrument panel is a warning light indicating low transmission-oil pressure.

Internally, lubrication-oil distribution to the clutch and brakes has been improved, the primary brake-coolant valve having been replaced by a lube priority valve and signal valve. This makes additional lubricant available for braking, even when oil pressure is low. In addition, the main pressure-relief valve has been modified to eliminate transmission damage during start-up at low temperatures. Transmission control has been improved to reduce shift shock when the transmission shifts into second range. Clutch capacity has been increased by fitting additional clutch plates, and the torque-converter thrust bearing has been strengthed. The steering downshift switch has been removed from inside the transmission and mounted externally to increase maintainability.

TASK 7. *Translate the text orally after looking through it once.*

Text 1D. Bundeswehr Armament Programmes

As a result of changes in defence policy, the German Army is undergoing a process of redefinition and restructuring, and intensive and realistic training is required in order to meet these demands. In future, a significant part of this training will take place in the new battlefield training centre with priority placed on training crisis reaction forces.

The need to establish a battlefield training centre springs from the following factors, amongst others:

- the increasing complexity of combined arms combat;
- the need for modern combat to be represented and evaluated as intensively and realistically as possible during training;
- the requirement for standardization in training as a result of the increasingly multi-national character of deployments;
- the restrictions imposed on the use of military training grounds and particularly on exercises held in open country (environmental obligations, lack of acceptance amongst the population);
- the need for operations to demonstrate a high level of cost-effectiveness.

Specialists do not view the training centres simply as a means to improve the quality of commander and troop training. Beyond that, the knowledge and data provided by the system will influence the continuing development of the army's concept and structure. The equipment installed at the centre, in conjunction with simulators, will represent the future basis for the "Technical Tactical Centre" planned by the Federal Ministry of Defence. As a result, it will have an influence on future development projects.

Notes:
spring from – происходить
deployment – развертывание
lack of acceptance – неприятие
cost-effectiveness – рентабельность
in conjunction with – совместно
simulators – тренажеры

UNIT 2

TASK 1. *Read and translate the text.*

Text 2A. The Future of the AFV

Time alone will reveal exactly how the fight against international terrorism will alter the way future armed forces can expect to be organized and operate. One thing is for sure. There is no longer a desperate need for the massive standing armed forces that have dominated military philosophies since 1940s. Those standing forces still contain tanks. For some time after 1940 the tank dominated the battlefield.

The tank is only one form of armoured fighting vehicle (AFV). It is a powerful mobile combat platform, yet it is also something that has developed over the years to fight a type of battle that is increasingly unlikely to happen again. In certain parts of the world, tank battles might be expected to occur during future conflicts. Tanks are supposed to be used in routine patrolling, check points, surveillance, information gathering and so on.

A partial but not complete solution to such strategic and tactical challenges is to leave behind many of the previously well-established concepts of AFV design and combat criteria. Future AFVs are to be smaller, lighter and more agile. Transporting smaller and lighter AFVs will thus be more painless, especially during airborne moves, while once on the ground such vehicles will be much easier and handier to manoeuvre in tight situations.

Yet size and weight are not the only considerations in AFV design. The power and capabilities of current anti-armour weapons are such that even the heaviest MBT remains vulnerable to hand-held anti-armour weapons. AFV occupants will still need as high a level of protection, active and passive, against such hazards as can be devised.

The old tank criteria of balanced firepower, movement and protection will still apply. Firepower is one area where technology seems to be keeping pace with protection, especially when gun performance can be supplemented by guided, long range missiles, although the mobility provided by ever more healthy power pack and drive trains seems to require little future emphasis.

Smaller and smaller gun calibres are now required to achieve the armour penetration performances of only a few years ago, while the protection provided by novel forms of armour, including shaped charge disruption systems based on explosives, can mean that carapaces can become less massive. Protection factors can expect to be amplified by the incorporation of stealth techniques enhanced by ever more sophisticated methods of concealment against electronic and optical detection. At all times agility and speed will remain highly desirable.

Reducing overall dimensions is one thing, but AFVs still have many functions to fulfill. Until recently, MBTs and armoured personnel carriers (APC), the two base elements of armoured warfare, called for differing vehicle designs.

Armoured personnel carriers evolved into infantry fighting vehicles, with their gun armament enhanced by the addition of anti-tank missiles. Their lethality is approaching the level once expected only from main battle tanks. Vehicles combining both combat functions on one platform will emerge.

On the Merkava the spare space available can house little more than an infantry weapon team, but future designs can be expected to provide accommodation for at least half an infantry squad. As electronics, along with power packs, become smaller and mechanized ammunition handling is increasingly introduced there will be a corresponding decrease in vehicle crew strength.

The combined function platforms in question will never entirely replace the foot soldier's armoured carrier. Not only will they be able to carry more troops but the armoured personnel carrier's versatile hull can be adapted for all battlefield tasks, from weapon carrier to ambulance. It seems the importance of the AFV as a major combat platform will gradually decrease but it will never go away.

One further restraint against sudden change is that there are currently thousands of AFVs of all types in service all over the world. Just because their value has recently been demonstrated to be in partial decline, the armoured fighting vehicles under consideration still have long anticipated service life expectancies ahead. They cannot, and will not, be phased out overnight. New ways of using them will be found, and their very form will no doubt be altered to suit those requirements. There will always be the possibility that somewhere, somehow, the old spectre of full-scale conflict of the size of past AFV battles will still arise. For this reason, the heavy AFV will continue to be developed, although on what overall scale is still difficult to determine.

Essential Vocabulary

standing armed forces – регулярная армия
philosophy *n* – основные принципы
challenge *n* – сложная задача, проблема
agile *a* – подвижный, маневренный
surveillance *n* – наблюдение
handy *a* – удобный
tight *a* – трудный
considerations *n* – вопросы, которые нужно рассмотреть, продумать
vulnerable *a* – уязвимый

occupants *n* – люди, находящиеся внутри транспортного средства
hazard *n* – опасность
performance *n* – характеристики, эксплуатационные качества
power pack – блок питания
drive train – система приводов
emphasis *n* – особое внимание
shaped – профильный
disruption *n* – разрушение
carapace *n* – панцирь
enhance *v* – усиливать
concealment *n* – укрытие, маскировка
call for *v* – требовать, предусматривать
infantry *n* – пехота
versatile hull – универсальный корпус
phase out *v* – снять с вооружения

TASK 2. *Translate the noun groups.*

A mobile combat platform; armoured vehicle design criteria; hand-held anti-armour weapons; long-range missiles; armour penetration performance; charge disruption systems infantry fighting vehicle; an infantry weapon team; anticipated service life expentancies.

TASK 3. *Translate into Russian. Pay attention to Predicates of the type:* ***seem, happen, prove, is likely, is certain, is considered, is supposed + Infinitive.***

Example: The error is sure to have been eliminated.
Ошибка, несомненно, была устранена.
The cooling proves to depend on...
Охлаждение, очевидно, зависит от...

1. Smaller gun calibres are required to achieve…
2. Smaller gun calibres are found to have achieved...
3. The adjustment is sure to have been done.
4. Protection factors prove to have been amplified.
5. The size and weight are likely to have been reduced.
6. This device has been demonstrated to be…
7. The future design is expected to provide…
8. The platforms happen to have been replaced.
9. Their form is supposed to be altered.
10. The phenomenon is considered to have influenced…
11. The work seems to be going on.

12. Tank battles might be expected to occur.

13. In current conflicts these weapons appear to be a threat to armoured vehicles.

14. Suspension components appear to have been carried over from the earlier series.

15. A combined combustion air cleaning is expected to remove 98 % of dust particles.

16. If the speed is low, there does not seem to be any reason why a crewman should not traverse the turret prior to halting.

17. The space available in the hull is sure to allow two tired crewmen rest, while the vehicle is controlled by the third man.

TASK 4. *Translate the questions into English, then answer them.*

1. Где будут использоваться танки в будущем?
2. Как должны измениться боевые бронированные машины?
3. Почему более легкие машины маневреннее в десантных передвижениях?
4. Какие вопросы надо рассматривать при конструировании бронемашин?
5. Что необходимо для достижения лучших характеристик броненепробиваемости?
6. Какое вооружение используется на пехотных бронетранспортерах?
7. Каковы функции корпуса бронетранспортера?

TASK 5. *Make up a plan of the text. Write down a short summery. The following phrases are to help you:* ***the article discusses; concerns the questions of; deals with; is about; the problem of..., is analysed; in conclusion; in addition; it is emphasized.***

TASK 6. *Look through the text, then translate orally without looking up new words in a dictionary.*

Text 2B. Terrex AV81

When announcing the development of the *Terrex* at the 2001 Idex show in Abu Dhabi a Singapore Technologies Kinetics official said that the vehicle would feature a removable roof, that this roof would be field-interchangeable. This must be one of the main aspects of modularity about the *Terrex*, not only enabling it to be fitted with various kinds of overhead turrets when the vehicle is not used for plain troop

transport, but also allows it to be converted into a mobile mortar system with swing roof doors. Maximum turret size would be 105 mm.

At 17.5 tones, the *Terrex* is somehow lighter than its Swiss counterpart, although its absolute maximum operational weight could be increased to 25 tonnes. A company official said that one of their strategies was to use as many known but proven components rather than try to reinvent the wheel. For instance, the entire rolling suite was designed by Timoney, providing a total suspension stroke of 400 mm (250 down and 150 up from normal resting position).

Made of welded steel plate, the *Terrex* design draws on experience gained with the development of the Bronco when it comes to mine protection. It has a double floor, the lower V-shaped, that protects it from a mighty 12 kg of TNT blast, a feature that was apparently demonstrated with the Bronco. The vehicle looks massive for its size – and it is: with its removable roof, the entire hull has to rely on absolute stiffness of the floor.

The manufacturer obviously wants to be able to input as many things from potential customers regarding armouring, for example. As the company says, "it has tremendous potential for technology insertion – for instance, hydro-pneumatic suspension, hydraulic or hybrid drive systems" and so forth.

TASK 7. *Read and reproduce the text.*

Text 2C. Soldiers of the Future

In the researchers' designs, soldiers of 2011 will step into wired uniforms that incorporate all the equipment they need. The uniforms will plug them into a massive network of satellites, unmanned planes and robotic vehicles the military has planned.

Soldiers will first wear an undershirt netted with sensors that monitor heart rate, body temperature and respiration.

Then comes a uniform with built-in tourniquets that might be tightened and loosened remotely. Body armor is built into a load carriage that holds water, ammunition, batteries and circuits to keep the soldier plugged into the network.

When dressing for battle in the so-called "Scorpion ensemble", soldiers will don no more than 50 pounds (22.5 kilograms), making them much more mobile than today's troops, who carry up to 120 pounds (54 kilograms) of gear.

The ensemble will plug the soldier into the military's planned Future Combat System, for which the Pentagon recently earmarked $15 billion to develop.

That Combat system envisions lighter tanks, powerful computer networks and larger fleets of remote-controlled airplanes and robotic ground vehicles. The first battalion could field the system by late 2010.

The most high-tech component will be the helmet, with tiny, built-in cameras to spot enemies lurking in the dark or concealed by bushes. The cameras' images will appear on semitransparent screens attached to their helmets.

Every soldier will eventually be able to view thermal images from uncooled infrared cameras, which are only in limited use today.

Soldiers who get lost will view maps, global-positioning coordinates and other data on their location. The same sort of data could be used to call in air strikes.

The way the soldier will interact with the system is still under development. Voice activation is a goal, but difficult because of varying accents.

The goal is to give soldiers important information without overloading them.

Within five years, the XM29 should be ready for combat. The weapon will fire the same bullets as today's M16s and M4s, but will also launch programmable "air bursting" grenades that explode in the air to rain shrapnel on an enemy's head.

The same gun could fire non-lethal projectiles – perhaps nets – to incapacitate enemies.

For soldiers who need heavier firepower, several corporate, military and university labs are developing robotic vehicles that could launch mortars or other weapons, serve as remote eyes and ears.

Another project at MIT envisions thin films that would monitor a soldier's breath for exposure to toxins, then signal the system to release the appropriate medicine.

TASK 8. *Read the words and try to understand their meanings.*

plug into of electrical equipment – be connected to the main supply of electricity
netted with – be covered with smth
armour *n* – special clothing to protect the body
tourniquet *n* – piece of fabric that is tied tightly around an arm or leg

tighten *v* – make smth firm
loosen – to make smth less tight
don – to put clothes on
gear *n* – equipment needed for a particular activity
earmark *v* – decide that smth will be used for a particular purpose
envision *v* – imagine what a situation will be like in the future
spot *v* – see, to notice
lurk *v* – wait somewhere secretly
conceal *v* – hide
call in *v* – ask for smth
mortar *v* – heavy gun that fires bombs and shells
incapacitate *v* – make smb unable to live and work normally.

TASK 9. *Answer the questions.*

1. What kind of network will soldiers be part of?
2. What parameters will the undershirt equipment monitor? Why do you think it is necessary to control these parameters?
3. What will body armour contain?
4. What will make soldiers more mobile?
5. What will Future Combat System consist of?
6. What will be the most high-tech component of the uniform and what information will a soldier receive?
7. What sort of projectiles will soldiers fire?
8. What other equipment is being developed for future soldiers?

TASK 10. *Translate the text into Russian in writing. Pay attention to compound terms.*

Text 2D. Increased Armour Protection

In addition to installing a more powerful and efficient power pack and greatly superior suspension, Teledyne has been working on improving the protection of the M60. This considerably increases its survivability, as well as changing its appearance.

One of the most important features of the armour package devised for the M60 is the addition of armour plates, up to 22 mm thick, to the front, sides and rear of the turret and to the front of the hull. These plates are of high hardness steel with a Brinell Hardness Number of more than 500 and they provide significantly higher protection against kinetic energy projectiles of up to 125 mm caliber, particularly over the frontal arc. Thinner plates of the same high hardness armour are also

added to the top of the turret and engine compartment to provide increased protection against projectiles of up to 30 mm calibre, such as those fired by the cannon of the Mi-24 *Hind D* attack helicopter and MiG-27 *Flogger D*.

Another major feature of the armour package is the addition of side skirts. These consist of single plates of high hardness steel armour at the extreme front and over the rear part of the hull. However, over the rest of the hull sides the skirts consist of sandwich panels made up of two plates of high hardness armour and, in between, a layer of *Sital* or similar material effective in resisting the penetration of shaped charge jets. Similar materials can also be installed between the high hardness steel plates added to the turret front and sides and the original, cast armour. As a result, the armour package devised for it by Teledyne increases the protection of the "Super" M60 both against high velocity kinetic energy projectiles and against the shaped charge warheads of anti-tank rockets and guided missiles.

UNIT 3

TASK 1. *Read the text, translate into Russian paying attention to grammar constructions.*

Text 3A. Armament Developments

When a guided missile is launched, it is gone forever, hit or miss. Guns can fire highly effective projectiles repeatedly and accurately, vary the nature of their ammunition according to specific fire missions and carry on firing until a target is neutralized. They are also much quicker than missiles to respond to fleeting targets, while the capabilities of modern fire control systems ensure the chances of a first round hit are high.

For these reasons guns still predominate in the armoured fighting vehicle armament world.

Missiles are now intruding to a greater extent than only a few years ago. It seems that tank gun upper calibre limits have been reached and may even be reducing.

Not so long ago it was forecast that future tank gun calibres would have to be at least 140 mm to defeat the heavily armoured monoliths

they were likely to encounter. Several factors have prevented this happening.

The on-target efficiency of current projectile types have already reached the stage where 120 or 125 mm armour-piercing projectiles can attain the performance levels once forecast for 140 mm or even heavier guns. Moving down the scale, the coming generation of 105 mm tank guns is promising performance not far from those currently delivered by 120/125 mm. Even modest calibres, such as 25 mm, now have considerable armour penetration potential and can inflict damage once thought of outside their calibre capabilities.

140 mm guns may still be promoted for several reasons. Yet they will also bring handling and logistics problems. The number of on-board 140 mm rounds any tank can carry will be severely restricted. Too few on-board rounds mean frequent tactical withdrawals for reloads, during which time the tanks are neutralized, to say nothing of the logistic chain that will have to be involved. Another factor is that storing and handling large 140 mm rounds within the confines of a turret is going to be a laborious, not to say impossible task. The only answer to this is the introduction of fully automated loading systems. Externally mounted, over-hull gun installations might overcome such constraints but they will still be complex technical challenges, and very expensive.

Among the most powerful guns now in service are the *Rheinmetall 120* mm gun (the US M256) and the Russian 125 mm 2A45/2A46 series, both smooth bored.

Away from *Rheinmetall* developments, Russian 125 mm gun systems have undergone some improvements of late, although the guns themselves have altered little. Most recent 125 mm gun developments have involved the ammunition, where the old, inefficient disc-pattern sabots have been partially replaced by discarding sabots imparting better ballistic performance once the projectile assembly is out of the muzzle. Extended length penetrator rods of advanced design have appeared. Norinco of China has adopted Western design approaches for its 125 mm APFSDS and has also developed a 120 mm smoothbore gun to arm the Type 89 tank destroyer.

Although tank guns used to fire anti-armour projectiles, heat projectiles can still be employed to provide blast and fragmentation effects against personnel targets. Far more effective and accurate against field targets and structures are high explosive (HE) shells. These have duly

been added to existing 120 and 125 mm ammunition families. 125 mm HE projectiles have been around for at least three decades but the introduction of 120 mm equivalents to Western ammunition families has been slower.

What will probably be the most significant recent advance in tank gun ammunition accomplishments for decades will come when the American Tank Extended Range Munition (Term) completes its development cycle. Although handled, loaded and fired as a conventional projectile, the Term will be a "fire-and-forget" multi-sensor projectile engaging tank targets at extended ranges. The family of Russian laser-guided munitions are now in service on a significant scale. Perhaps the best known of these is the *9M117 Bastion* projectile fired from 100 mm D-10 series tank guns.

The distant future will no doubt see the introduction of tank guns based around electrothermal chemical, electromagnetic or laser-based directed energy technologies. Experimental models of such guns have been extensively tested in several countries. Even so, their conversion to service-standard weapons, capable of prolonged use and consistent characteristics, is still a long way off, as is any practical form of liquid propellant.

Essential Vocabulary

miss *v* – не попасть в цель
intrude *v* – вторгаться
specific *a* – конкретный
fleeting target – быстро проходящая цель
forecast *v* – предсказывать
encounter *v* – столкнуться, встретиться
armour-piercing projectile – бронебойный снаряд
inflict damage – наносить ущерб
round *n* – патрон
withdrawal *n* – извлечение, экстрагирование гильзы
handling – транспортировка, доставка, управление
logistics *n* – материально-техническое обеспечение
confine *n* – ограничение
hull *n* – корпус
discarding sabot – подкалиберный снаряд с отделяющимся поддоном
penetration rod – пробиватель
smoothbored gun – гладкоствольное орудие

tank destroyer – противотанковое орудие, самоходная артиллерийская установка
fragmentation *n* – осколочное действие
service weapon – боевое оружие
standard weapon – штатное вооружение
munitions *n* – боеприпасы
accomplishment *n* – достижение
engage the target – поразить цель
consistent *a* – постоянный, стабильный

TASK 2. *Translate the following noun groups:*
calibre limits; upper calibre limits; future tank calibres; fire control; fire control systems; fire control systems capabilities; performance levels; over-hull gun installations; length penetrator rods; design approaches; vehicle weapon; rapid-fire weapon; current projectile types; armour penetration potential; fully automated loading systems; a projectile assembly tank gun ammunition accomplishments; a "fire-and-forget" multi-sensor projectile; laser-based directed energy technologies.

TASK 3. *Translate the sentences. Consult a dictionary if you don't know how to translate the words:* ***while, as, once, thereby, in order, because of****.*

1. While all such mountings (орудийные установки) can offer numerous combat advantages, they have to be limited to cannon calibres.
2. Guided missiles provide a long range potential while the more economic guns provide closer range fire.
3. Once such a missile is launched it is out of human control.
4. APFSDC, once limited to the large tank guns, is now available for smaller calibres.
5. While the Swedish Army is pleased with the CV-9040, other customers have selected a different cannon.
6. As discussed above, such indirect vision is not satisfactory because of the lack of direct human vision.
7. As the conventional two-man turret gives way to an external mounting the size of the mounting will become smaller.
8. Large calibre external gun mounting lowers the vehicle size, thereby assisting concealment on a battlefield.
9. Indirect vision has to be provided in order to give protection from threat.
10. As a further example, a turretless tank is under consideration.

TASK 4. *Translate into Russian. Recollect how to translate modal verbs and their equivalents.*

1. Such systems have to function within very tight time limits.
2. Threats could be observed by radar or a laser beam.
3. The roof-mounted radar is to detect incoming projectiles.
4. In spite of smoke screens AFVs might be detected by infrared sensors.
5. If the ordnance (оружие) is to be carried in an unmanned turrent, the sensor head can be placed above the mounting.
6. A Battle Management System should be able to give the commander an indication of where enemy targets might lie.
7. This problem could have been solved with the addition of a panoramic optronic sight.
8. The gun and ammunition will have to be replaced.
9. It might be expedient to move rounds out of the hull.
10. This factor should be considered as a disadvantage.
11. A lift-and-turn mounting should be capable of being removed and changed.
12. The breech will have to be resistant to small arms fire.
13. If the new vehicle configuration is to be based on this model, then its advantage will be its compactness.
14. Indirect vision might have to be provided in order to give protection from Directed Energy Weapons.

TASK 5. *Translate into Russian the sentences containing attributive clauses which are joined to the principle clause without conjunctions.*

1. The 40 mm gun Sweden has adopted acts as the main armament.
2. The tank the Republic of Korea army requested to reequip its armoured units with was designed by General Dynamics.
3. One prospective customer the K1-M was developed for was assumed to be Malaysia.
4. The export model, the *Challenger 2E*, Oman ordered for its army had some changes for operating in hot environment.
5. A new turrentless vehicle two crewman will handle will allow free movement of the infantrymen within their vehicle.
6. Track shoes[1] the company have introduced can outlive many of their recent contemporaries.

[1] Башмаки звена гусеницы.

7. One of the first defence aid system Russia ever exhibited was the *TdhU1 Shtora* anti-tank missile jammer.

8. The system the MT-LBu armored track chassis are equipped with is intended for long-range detection of the contamination.

9. Sophisticated weapons two men from concealed areas can operate are a threat to armoured vehicles.

10. Automatic loading the West decided to apply to the MBT may load rounds directly from sealed stowage[1].

TASK 6. *Read the text, translate and retell it.*

Text 3B. Antitank Missile Systems

According to military experts the efficiency of antitank defence is dictated by antitank guided missile (ATGM) systems, both portable, used by infantry and mobile, carried by trucks, armored personnel carriers, infantry combat vehicle, tanks, helicopters and aircraft.

Russia's KBP Instrument Design Bureau has developed a new generation vehicular/portable ATGMs of the 2nd class, Kornet, based on the principle of direct missile attack on frontal target projection. The system features semiautomatic control and laser-beam guidance of missiles. The Kornet retains the design concept of the Konkurs system: alongside with installation on any self-propelled tank-killer vehicles, including those provided with automated ammunition stowage, it can also be used independently as a portable weapon owing to the small weight of its launcher.

The system comprises:

– launcher with tracker, laying drives and launching mechanism;

– thermal-imaging sight;

– guided missiles in transporting-launching containers.

In combat, the operator should detect a target through the optical or thermal-imaging sight, lock on and track the target, launch a missile and hold the sight reticle on the target until the latter is destroyed. The launched missile is placed on the line-of-sight, and futher sighting is performed automatically.

The powerful tandem shaped-charge warhead of the ATGM can destroy all modern and perspective tanks including those provided with explosive reactive armor.

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[1] Герметичный контейнер для хранения.

Based on the "detect-and-fire" principle the Kornet system is a versatile weapon, i.e. its characteristics are independent of target signature over the optical and IR range of electromagnetic waves. Equipping the guided missiles with a warhead of another type – thermobaric, high-explosive, enables to destroy a variety of secondary targets (engineer constructions, fortified emplacements, machinegun nets and so on).

These capabilities are not inherent in the long-range ATGW 3/LR system, since its passive homing warhead locking on the target at the start cannot be effective to fight secondary targets, because of their low thermal signatures.

The Kornet system costs one-third/one-fourth as much as the ATGW system 3/LR, but can hit with the same combat efficiency and expenditure three to four times as many targets.

The Kornet system boasts total immunity to active and passive (obscuring smokes) optical visual jamming. High immunity to active optical jamming is obtained via a missile photodetector directed to the firing system. In case of obscuring smokes, the operator can observe the target in the thermal-imaging sight and the "detect-and-fire" principle is ensured by the high energetic potential of the laser-beam guidance channel.

The optimization and testing of the Kornet system when launched from prepared and unprepared positions (including sandy ground, solonchak, seashore, above water surface) have been completed.

The system is reliable, simple and easy to operate.

TASK 7. *Read the text and write a summary giving the main points. Use the following verbs in Passive:* ***are described*** (описываются)***, are discussed*** (обсуждаются), ***are outlined*** (кратко описываются)***, are considered*** (рассматриваются) *and phrases such as:* ***a shord description of … is given, a study of … was performed, an analysis was made of …, attention is given to …, it is concluded that …*** *Suggest a headline for the text.*

While being a member of a tank crew has never been a safe job, the potential for danger exists much more now than ever before. Not so many years ago the usual methods of attacking a tank were limited to tank or anti-tank guns and mines. Infantry tank-killer squads could cause considerable damage but their effectiveness reached the dangerous stage only when shoulder-launched anti-tank weapons enabled a single foot soldier to knock out almost any tank.

Since the Second World War the numbers of ways a tank can be attacked has grown dramatically. Not only have the range and effectiveness of infantry shoulder-launched weapons increased but they have been joined by crew-served guided missiles in its many forms. Artillery projectiles, both tube and rocket delivered, have always been an enemy of the tank but their lethal potential has been amplified by the introduction of cargo projectiles. Most of these deliver swarms of small dual-purpose bomblets. Of late these have been joined by much more potent anti-armour submunitions that can automatically select and attack a target via its top armour.

Electronics have further extended the scope of anti-tank mines by introducing sensors that lay in wait to detect armoured vehicle targets and then attack them at the appropriate instant, either by initiating a rocket-delivered warhead or a charge launched to descend onto the target's top armour. Another relatively resent hazard has been the introduction of rapid minefields that take only minutes to dispense, either from special mine laying systems or from artillery cargo projectiles.

All of these attack methods are land based. The scope of air-launched weapons only adds to the potential risks.

The main protection for AFVs against all these hazards is currently armour. Armour forms the very essence of the armoured fighting vehicles, shielding the vehicle and its occupants against incoming harm. Yet it is not the only method of protecting combat vehicles.

AFV armour has traditionally been hardened steel. Thick steel slabs can do much to defeat incoming armour-penetrating projectiles, but there are practical limits to what they can achieve. For a start there is the sheer weight of steel. To provide something approaching complete protection against the latest kinetic and chemical warheads, monobloc steel armour now has to be over one metre thick, making it impossible to provide an AFV with complete cover away from parts of the frontal arc. The sheer weight alone would make any armoured vehicle so ponderous that it could not be a practical combat platform. Replacing steel with lighter materials, such as aluminum or one of its alloys, provides less protection although it can be effective on lighter vehicles.

One partial solution in the past has been to add extra armour at the more vulnerable points around the hull and turret and another is the provision of modular stand-off panels held away from the main hull. The latter solution can be effective against shaped charge warheads,

while the addition of the former usually adds to the weight problem. However, extra passive armour panels are one measure that can considerably extend the useful service life of older vehicles.

Explosive reactive armour can be used to cover vulnerable points of an armoured vehicle to provide extra protection against shaped charge warheads. Striking ERA initiates the incoming shaped charge to develop the high temperature jet intended to burn its way through the main armour, but the explosive content of the ERA is also initiated and detonates; the ERA container walls will then be thrust outwards to scatter and disrupt the jet, degrading its armour penetration capabilities before it can do its intended work.

Another recent protective innovation has been the development of defensive aids suites (Das). Although the basic techniques have been commonplace for years in other defence spheres, notably aviation, they appear as a recent development in vehicles. In broad terms they act as autonomous protective sentries and can initiate defensive countermeasures automatically.

Perhaps the simplest examples related to AFVs are fire detection and suppression systems. Sensors detect the fire or explosion within the engine or crew compartments and either actuate fire extinguishers or discharge inert gases that quench the fire by removing the necessary oxygen.

TASK 8. *Translate the text into English using English equivalents of Russian words and phrases given after it.*

Text 3C. Танк-робот и его большой «брат»

Российские оружейные конструкторы продолжают разрабатывать конструкцию танка, в котором не будет экипажа, – его заменят роботизированные системы. Действующие макеты такой машины уже существуют. У танка-робота будет дистанционное управление – оператор может находиться за полтора-два километра от машины. Танк способен маскироваться на поле боя, выбирать цель, поражать ее и «докладывать» об этом на командный пункт. В башне будет устройство, похожее на перископ, выдвигающееся как по вертикали, так и по горизонтали.

Разрабатывается еще один новый танк – Т-95. Танк весом в 50 тонн планируется оснастить газотурбинным двигателем мощностью 1250 «лошадей».

Пушка Т-95 (калибр 135 мм) располагается в «необитаемой» башне. Такого в истории танкостроения еще не было. Танку не нужен заряжающий. Его заменяет ловкий автомат заряжения пушки, устроенный под башней. Рабочие места экипажа (три человека) находятся в специальной бронированной капсуле, что значительно повышает безопасность. Такое техническое решение позволяет уменьшить размер танка, делать его менее заметным на поле боя – машина может укрыться даже в высоком бурьяне. У танка будет самая совершенная система «активной защиты», способная сбивать специальными гранатами подлетающие снаряды противника на расстоянии 50–70 метров. Лазерный «глаз» танка замечает опасную цель и дает команду на ее уничтожение без вмешательства человека.

Эту машину можно будет назвать лучшей в мире в своей категории.

Notes:

макет – mock-up
перископ – periscope
выдвигаться – to extend
необитаемый – unmanned
ловкий – smart
заметный – noticeable
бурьян – tall weeds
сбивать снаряды – shoot down projectiles
смертельно опасный – mortally dangerous
вмешательство – interference
маскироваться – to camouflage itself
укрыться – to cover itself
мощность в лошадиных силах – horsepower
поле боя – battle-field

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