

## ORIGINAL SCIENTIFIC PAPER

# Correlation of Physical Fitness and Professional Military Training of Servicemen

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## Abstract

This article demonstrates that physically trained military personnel are more skilful and perform professional military actions much faster than poorly trained soldiers do. We have shown that, regardless of the characteristics of the professional activity of any military experts, its effectiveness is closely linked to their level of physical fitness, which in turn plays a significant role in the formation of the professional skills and capabilities of military experts. To assess the military and applied skills of servicemen, we have researched them performing exercises and meeting combat training standards (shooting machine guns, loading tank ammunition, constructing a single trench for shooting, etc.). The results of the exercise and performance assessment enabled the determination that physical training of troops is closely linked to combat training and contributes to improving the professional skills of military personnel.

**Keywords:** *military, servicemen, troops, performance, physical qualities, professional skills*

## Introduction

Currently, one of the major problems is the comprehensive reform of the process of training and education of cadets who will become the officers of the Armed Forces of Ukraine. Providing troops with sophisticated military equipment, their improvement, and the need to maintain constant combat readiness of units require thorough improvement of combat training. Modern military operations, which are currently underway, do not reduce but rather increase the value of professionally important qualities of each officer.

The use of physical exercise to improve professional training of military, as confirmed by the historic experience of combat training, began long ago. There have been changes in weapons, military equipment, methods and tactics of warfare, but the importance of the physical fitness of servicemen

for their successful military combat activities, as studies of outstanding scientists show has not decreased but has constantly grown, requiring specific differentiation (Klymovych, Olkhovyi, & Romanchuk, 2016).

The importance of the physical condition for the effective execution of military-professional work was proved by many scientific studies and centuries of war experience, including fighting in “hot” spots. Many experts consider physical condition to be the foundation for other components of the combat readiness of military personnel. This is because the level of development of certain physical qualities determines the overall physical ability of servicemen to perform separate motor actions and complex motor activities of differing character.

Abundant evidence has accumulated that proves that the



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good physical condition of soldiers is an integral part of the successful implementation of their professional military duties, and the foundation of their combat effectiveness (Oderov et al., 2017).

During the reform of the Armed Forces of Ukraine, an opportunity appeared to abandon the outdated methods of verification and assessment of physical fitness and implement the most effective ways to assess and verify the organization of training for servicemen. Therefore, the analysis of research results allows us to insist on the need to develop programmes, standards and tests for the army that would determine the degree of basic physical abilities of soldiers of various specialties and the degree of a person's ability to perform tasks in accordance with the chosen speciality and the requirements of military service (Romanchuk, 2015).

The purpose of the article is to prove the interconnection between physical fitness and military-vocational training of servicemen.

## Methods

In order to improve special physical training and find ways of intensification, to study the level of employability, and to define dependence on physical qualities of servicemen, we studied the relationship of physical fitness and military training of military personnel in the course of field training exercise of personnel of the Faculty of Combat Employment of Troops, the Faculty of Missile Troops and Artillery, and the Faculty of Combat (Operational) Support of the National Army Academy, named after Hetman Sahaidachny, on performing exercises of PT and standards of combat training with the use of personal protective equipment (body armour of "Le Corsaire" type, Kevlar or metal helmet and with a weapon).

The methods of analysis, mathematical and statistical processing of the obtained data were used during the study. Execution of the obstacle exercise was carried out as part of the training groups. The result of the implementation of the practical component of exercising physical and vocational training was measured with a CASIO electronic stopwatch with an accuracy of 1 s. The investigation of the average result of firing from an automaton by soldiers was determined in case of a hit in two of three targets or in the third. The study was conducted during scheduled sessions on physical and military training at the range within three months of systematic training. We were formed by two groups of each military specialty, physically trained and less trained - 1st (n=32), 2nd (n=34) of artillery servicemen; 1st (n=29), 2nd (n=38) servicemen of tank units; 1st (n=35), 2nd (n=64) servicemen of mechanized units. This study involved 232 cadets of the departments of combat use of troops, rocket troops and artillery, all-military faculty, training specialists in combat (operational) support. Each training group was tested in scheduled training sessions in approximately one period.

The results of the research were processed using mathematical statistics methods of using the Statistica 5.5 software. We also applied the methods of parametric statistics. The level of reliability was determined using a dual two-way t-test for the average.

## Results

We have shown that, regardless of the features of professional military activity of any military experts, its effectiveness is closely linked to the level of their physical fitness. This conclusion is confirmed by the survey results during the field training exercises (FTXs) (Table 1).

**Table 1.** Indicators of professional military training of artillery servicemen during FTXs, (n=66)

Groups of servicemen	Indicators	Before exercises	On the final day	p
		M±SD	M1±SD	
1st (n=32)	Time to complete obstacle course, sec	129±0.9	131±0.9	>0.05
	Results of machine gun firing, marks	68±2.6	67±2.7	>0.05
2nd (n=34)	Time to complete obstacle course, sec	138±1.2	166±1.4	<0.001
	Results of machine gun firing, marks	66±2.4	42±3.3	<0.001

The advantage, by the results of these tests, is held by physically better-prepared servicemen (n=32), and compared with less physically prepared soldiers (n=34) is significant. The results in overcoming obstacles of less prepared soldiers deteriorated by 28 seconds ( $p<0.001$ ), while in the best group the results declined by only 2 seconds ( $p>0.05$ ). The results of the research suggest the physical unpreparedness of most military servicemen to endure significant physical pressure for long periods of professional military activity. It should also be noted that training during the FTX was not always carried out with maximum load, which modern combat conditions offer.

The results of firing the Kalashnikov machinegun also showed the advantage of physically stronger servicemen over the personnel of the less prepared group ( $p<0.001$ ). Servicemen of the weaker group hit the target fewer times at the end of the FTX, which confirms the lack of psychological readiness to endure significant physical and psychological pressure of combat conditions.

The importance of physical fitness affects modern professional military activity, accompanied by relatively low loads.

Thus, during lengthy FTXs and while performing tasks in hermetically sealed objects (energy spending ranged from 2,762 to 2,814 kcal/day), the servicemen from the better physically prepared group showed significantly higher results in professional military training than the soldiers from the group with the lower level of physical preparation (Table 2).

## Discussion

In the course of our research during the FTXs, we found that physically well-prepared cadet of mechanized units perform actions related to the implementation of manoeuvre on the battlefield up to 20-35% faster than those with a low level of physical fitness. Thus the longer the fighting, the more substantial the difference. Actions related to boarding technique and leaving it, hiding in various shelters, performing speed runs, are performed by soldiers with good physical condition 15-20% faster than by the soldiers with a low level of physical fitness.

Compared to physically poorly prepared servicemen, physically-well trained military of artillery units perform

**Table 2.** Indicators of professional training of military servicemen of tank and mechanized units during FTXs, (n=166)

Servicemen of tank units									
Groups	Tank ammunition loading,%			Precision of shooting%			Time of fire task performing,%		
	Before FTX	After FTX	Changes	Before FTX	After FTX	Changes	Before FTX	After FTX	Changes
1st (n=29)	100	80	20	100	75	25	100	117	17
2nd (n=38)	100	40	60	100	55	45	100	237	137

  

Servicemen of mechanized units									
Groups	3 km paramilitary cross, min., sec			Machinegun shooting, marks			Making a single trench for shooting prone		
	1st (n=35)	14.19±2.1	14.37±1.9	0.18	57±1.9	51±2.4	6	512±0.9	529±0.7
2nd (n=64)	14.28±2.6	15.21±2.8	0.53	53±2.3	29±3.8	24	518±0.6	534±1.1	0.5

the actions to bring guns in combat and marching position, to lay and charge, to deliver ammunition to a firing position and other activities faster, more precisely and more skilfully. Their advantage in implementing various professional military techniques is more pronounced the higher physical and mental pressures the soldiers experience. This leads to the fact that artillery squadrons whose personnel are better prepared physically are capable of performing the first sighting shot and to fire 20% faster than the squadrons with worse physically prepared personnel (Oderov, 2014).

The positive impact of the components of physical condition extends to the professional military careers of servicemen of other military specialities. Excellently physically prepared tankmen more quickly and more accurately than poorly physically prepared ones perform the techniques associated with firing from a tank gun. In long combat training, the speed and shooting accuracy of such troopers is reduced by half compared to those servicemen who are worse physically prepared. During a multi-day advance action, the significant advantage of physically well-prepared tankmen in their accuracy and speed of manoeuvring becomes evident. High levels of physical fitness allow the car drivers to perform actions associated with servicing machines quickly and more efficiently, as well as operating the machine in difficult conditions.

The positive impact of physical state indicators of servicemen on the components of their combat capability phenomenon is caused by the skills transfer (training, fitness, experience).

The physical condition of radar operators influences the speed of target search, identification their coordinates, situation assessment and decision making in difficult conditions, as well as the number of errors the operators make during duty. Therefore, soldiers with excellent physical condition make mistakes approximately 50% less than those with a low level of physical fitness and functional capacity do.

The degree of use of aircraft manoeuvring capabilities and the efficiency of air shooting largely depend on the physical condition of pilots. It is established that pilots with a good functional physical state can endure overload of 7.1–7.7 units, allowing full use of the manoeuvrable possibilities of fighter aircraft. At the same time, a pilot with a worse physical fitness state uses only 65% of manoeuvrable possibilities of an aircraft in similar conditions (Romanchuk, Popovich, & Krasota, 2011).

It is a fact that perfectly physically prepared sailors per-

form military and special techniques aboard their ship more quickly and accurately than weakly physically prepared ones do. In particular, they perform steps to prepare for torpedo firing much faster, which is especially important because in most cases the speed and precision of the personnel in performing such actions directly influence the speed of performing relevant manoeuvres or combat missions by the entire ship (Weidner-Dubrovin & Gamgarov, 1964)

In addition, the practice of military training proves that servicemen in excellent physical shape retain the speed and accuracy of fighting techniques longer and at a higher level under the influence of physical pressure and mental stress, and acquire knowledge, skills and abilities necessary to carry out these actions much faster. In other words, they master a military profession and adapt to unusual conditions of military life more quickly. The degree of interdependence between the level of the physical shape of military personnel and their level of military preparedness and education is greater the more complex the combat environment is. Common tasks of physical training reflect requirements for physical readiness of the whole personnel of the Armed Forces of Ukraine, and special tasks of physical training are identified by analysing the requirements for the physical shape of servicemen of different arms, services and branches of the armed forces.

This study shows that the vast majority of combat action is associated with different durations of movement by military equipment and vehicles both along the roads and over rough terrain. About 90% of respondents confirm the negative impact of motion sickness, action in specific conditions of high noise and air pollution while performing tasks related to the movement by vehicles on the fighting capacity of subordinate personnel, their physical, and physiological condition.

The results of the research aimed at understanding the nature of the methods and actions of military personnel in the performance of combat missions enabled clarifying the theory of special orientation of physical training, based on which the differentiation of evaluation standards was implemented in the exercises, reflecting the development of applied physical qualities of servicemen of different military specialities (Kyrpenko, V. Romanchuk, S. Romanchuk, & Fedak, 2015).

Therefore, when certain requirements of military activity by physical and mental activities, mode of physical motion activity, as well as current conditions are identified, the combat activities of servicemen of different military specialities are different. This significantly affects the requirements applied to

the physical and mental state of soldiers.

Having analysed the test results of the exercises performed and the standards of combat training, materials of special research, and methodological literature, we can state that the use of personal protective equipment and weapons (total fixed weight is approximately 25–30 kg) when performing motor actions will allow determining further the dependence of professional employability on the level of physical qualities of military servicemen, and in a short period will accelerate the training of servicemen for possible military action in pro-

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#### Conflict of Interest

The authors declare that there is no conflict of interest.

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tective combat gear and performing actions similar to combat fighting.

Thus, the importance of various indicators of the physical condition of soldiers in the structure of their readiness for combat activities is undisputedly proven. Physical fitness and the functional condition of the body positively affect all combat effectiveness of personnel, and significantly influence the overall effectiveness of military-professional work and commitment of troops to perform assigned tasks according to their positions.