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HISTORY AND FACTORS OF DEVELOPMENT OF ARMORED VEHICLE DRIVING TRAINERS

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Abstract: In the article armored technique driving trainers, their development history, various generations driving of trainers main structure their elements advantages and disadvantages, driver-mechanics preparation possibilities seeing developed Armored technique driving of trainers development effect doer factors was determined.
Keywords: trainee**,** driving, weapons and military equipment, armored vehicles, objective assessment criteria of the territory terrain .

Current at the time in the troops from trainers efficient use military servants preparation quality in raising the most important from directions one is considered
Modern trainers military of servants individual preparation and tactical component part in consideration received without, crews, reshoots, divisions and headquarters in the composition each bilaterally preparation provides.
Trainers are it military servants with them good quality and right work for known level preparation demand which high technological devices weapons and military the complexity of the technique and price modern science and technical advances maximum level used without trainers system set up reach economic in terms of to the goal more appropriate that considered to the degree did.
The simulator is a "man-machine" system operators professional preparation for designed to teach methods requirements answer of the "man-machine" system model done which increases and of the student activity quality control to do a technical tool that provides [1].
Historical in terms of trainers real in objects in teaching errors extraordinary consequences take coming possible and them eliminate reach big financial to expenses take coming possible has been in fields - military works, aviation, atomic energy and in space - appear it happened and wide spread Armored driving machinery. For trainers seeing we go out, their to himself typical from the features one is the student's vestibular to the device kinematic the effect supply, means of transport with the ground of the chassis real mutually is to simulate the effect [2].
Trainers are technical facilities as create history their to the structure included engineering solutions according to to posterity to be can .
Trainers to posterity to be conditional and one row factors with is defined as:
physical modeling for new of objects appear to be elementary of the base, including electronic, optical and electronic-optical equipment development level
mechanics, micromechanics and to them near of fields achievements; manage systems and especially exercise equipment in the field achievements and of work new principles work output [5].
Trainers improvement science and of technology development with parallel respectively done increased Scientific studies in the field of achievements application to the students practical skills absorb and them in assessment of trainers opportunities to improve possibility gave .

Trainers generation and structural features according to classification In tables 1, 2 given .

Table 1

Generations according to of trainers classification

A generation	**Creation the date**	**Base used**	**Trainers types**	
	1970	Mechanical part	demonstrative stands and physical layouts	Static trainers
1st generation	1973-1980	Lamped amplifiers	movie projection type trainers	Dynamic trainers
2nd generation	1980-1992	integrated circuit	TV trainers	
3rd generation	1996-1999	Exposure	computer trainers	
4th generation	Current time	Developed software eletr computing machine with supply	Complex computer simulators	

Table 2

Structural features according to of trainers classification

Type of trainer	**Structural features**
Static driving simulators	driving an armored vehicle department impersonator (all management elements and control-measurement equipment available) open cabin (hatch and rear wall no); teacher electromechanical device observation tool behind is located in it command the text and in command manage equipment location is displayed.
Walking trainers	armored of tenika walking part manage to the authorities gauges, to the body touch sensors is set, from them coming messages of the trainer to eletr computing machine come falls.
Dynamic film projection simulators	of the trainer cabin mechanic- driver worker to the place suitable comes; electrohydraulic drive (EGP) is used, its tension elements vertical swings of the simulator provides .
Dynamic television trainers	Content part: cabin and observation tool in front of built-in TV monitor; two with graded EGP equipped hydraulic device, its using the cabin in a range of ±15° vertical and horizontal is shaken; visual situation imitator; special Exposed of the guide remote control .
Modern to drive trainers	trainer cabin complete respectively to the driver - mechanic place suitable comes; hydraulic installation maximum respectively area (direction) terrain reflection is enough; software supply believable noise effects provides; observation system and noise situation imitation complete combative situation by creating gives; the trainer manage for multimedia in order from working electro computing machine networks is used. This of the trainer information-measurement system about electronic equipment integrated complex that to say possibility gives .

great Homeland from the war next period drivers-mechanics preparation and teaching for only from static trainers used (cabin training during own location does not change). In these trainers guide under the leadership of and teacher device using the armor technique object manage of the process sequence studied. Trainer control-measurement equipment pointers change mechanical pedal and equipment arrow dependence through done is increased. Marked study programmed this trainers from the student of actions strictly defined order demand does, this from the program each how estrangement error that classified. In static simulators management organs with at work only perform abilities is formed. Preparation level evaluation criteria as students program assignments perform speed and error free their performance account is taken.

Walking of the armor technique object in simulators walking part is used. To him and to the tankodrome addition equipment installed and marked of criteria right execution note will be done. Management department teacher and student near is located in order (in motor vehicle teaching process similarity with) organized will be done.

The trainer manage in the process of the teacher participation of systems work control do (trainer's belongs to work in the order), the electronic journal of studies conduct and to the student individual assignment from putting consists of Walking simulators of the "man - machine - ground" system similarity according to the most good indicator provides. Walking of trainers main and no doubt criterion - 100% availability effect.

Automatic assessment system disadvantage is that the trainer is specified direction complete connected. From this except, such study system driver -mechanic training the place work output armor technique object work from release more expensive, motor resources, fuel spending, to the tankodrome equipment installation for addition expenses demand will be done. Dynamic cinema projection simulators armor technique object manage process partially or complete repetitive, physical or mathematical modeling methods based on trainers includes.

Analog simulators the most important feature - objective assessment criteria using preparation level and quality relatively easily evaluation possibilities was All produced dynamic simulators are constructed according to the principle of "one student - one guide", that is, the set of simulators consists of student and guide seats. The dynamic simulator allows you to perform the following tasks: prepare the armor technique for driving, start and stop the engine, take off, change the clutch, turn, slow down and stop; to teach the driver-mechanic the correct and coordinated actions of the control mechanisms in accordance with the road conditions in the places with obstacles and limited crossings; monitor the indicators of control-measuring equipment. Using a set of videos on the simulator, it was possible to train them on changes and twists.

In addition to visual information, the driver felt the vibrations of the simulator body, as in the real machine. An important disadvantage of this trainer is that there is no logical connection between the speed of movement and the load.

The lack of terrain influence on speed and to some extent cabin shake, the static nature of cabin shake and engine noise, relatively low reliability and poor throughput led to the end of trainer production.

In dynamic television simulators, all information streams are processed by two counters installed on the router. These two counters are implemented in the form of a counting device and a specialized electric calculating machine. The calculator works together with a specialized electric calculating machine and calculates the dynamic characteristics of the machine's condition: engine and transmission performance, driving speed and, accordingly, develops control messages for visualization, hydraulic systems, instrument indicators and noise simulator systems.

Specialized electric calculating machine performs the following tasks: selection and installation of working procedures of the simulator complex through the referral system; preparing to start the engine at different air temperatures and monitoring starter, air and combined starting, stopping the engine; Preparing the engine for start-up in summer and winter conditions in the "Independent training" mode and analyzing the start-up, in which information about the sequence of the student's actions is automatically output to the monitor screen; assessment of the quality of training according to the standards of driving technique and average speed; issue a final grade for an exercise and view noted errors; control the operation of the program. With the introduction of a specialized electric calculating machine to the simulator, after the end of the training process, it was possible to provide the student with a summary table of the sequence of errors recorded during the driving process, their number and evaluation indicators (grades for technique and speed, reduction of grade for gross violations and final grade).

In modern simulators, the internal layout of the student's workplace and information processing software determine its uniqueness and purpose, nodes such as sensor system indicators, control panel, external situation display means and executive system are the same for different simulator systems.

Information is provided to the operator on monitors mounted on the target and tracking devices. Both analog and digital indicators are displayed on the monitor screens. The speed of the computer allows to fully synthesize the image of the earth and add various objects to it when displaying the environment. In addition, the environment image is linked to the motion parameters of the dynamic platform.

Modern trainers are universal. When they are used for the new armor technique model, only the cockpit and the software will be upgraded. These simulators have 3 modes of operation: "Interview", "Practice" and "Exam".

The driving simulator provides the following: simulation of the dynamic effect on the student in accordance with the topography of the territory and the characteristics of the tank's tread; simulation of normal failures and emergency procedures; automatic formation of the assessment for the performance of exercises in accordance with the assessment indicators of the driving course; constant visual control of the student's actions and recording the mistakes he made; forming a database of exercises and results of exercises previously performed by the student, viewing data on management monitors; two-way communication between the teacher and the student; to simulate the noise of the main units of the engine and tank working in different operating modes.

Thus, the trend of improving simulators for managing armor technique objects was revealed - moving from an "individual" simulator to a system of distributed modeling and remote training. This became possible only due to the introduction of computerization and information technology. The main factors in the development of modern educational and technical tools for training armor technique mechanic-drivers:

teaching and training; modeling of aggregates and systems of armor technique objects in real time; Modeling the interaction of the armor technique object with the terrain of the territory; modeling of the earth's surface according to the capabilities of the visual environment simulator;

visualization of the terrain model in real time;

modeling the interaction of objects in the virtual world.

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