



**HARDWARE-SOFTWARE SYSTEM  
«TRAIN DRIVER TRAINER - SIMULATOR»**  
can be produce for any vehicles  
type and any section of the road. Our  
product allows to solve the real  
problems which include not only  
traffic safety, saving of energy  
consumption or something else in the  
road but also preparation, retraining  
and certification of your new,  
untrained, really experienced or  
professional drivers and their

**HARDWARE-SOFTWARE SYSTEM  
«TRAIN DRIVER TRAINER-SIMULATOR»**



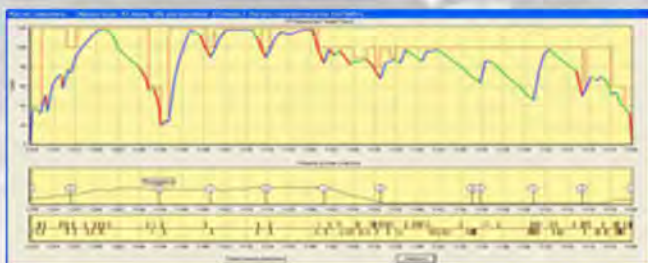
## HARDWARE-SOFTWARE SYSTEM «TRAIN DRIVER TRAINER-SIMULATOR»

Main constructive elements of train driver trainer are the model of locomotive control panel. This allows the train drivers in training feel in a familiar production environment

Trainer-simulator consists of the two work places such are an instructor's and train driver's workbenches. Both places have personal computers which are linked together using the local area network.

### Software of trainer can do the next:

- save, store and control databases about trains, its schedule, conditions, settings and results of training tasks;
- calculate optimal (from the position of energy-saving) modes of trains and take into consideration the parameters of train, conditions, road surface, speed limits and observance of traffic regulations;
- control the traffic conditions in the process of the task simulation, for example: control the light signalling system (LSS), change the track of moving in the railway stations, put obstacles in the track, change the weather and time of the day;
- simulate the widely-distributed fails in the locomotive and the light signals which can be repaired in the journey by driver and his assistant;
- model the locomotive control and power system. Driver can control them using the measuring equipment and the display devices which show the parameters in real time;
- model the air brake system and the air distributors in different modes for the freight, passenger trains and carriages;
- model the longitudinal dynamic of the trains and estimate the maximal value of the longitudinal dynamical stresses in the train (with accurate within 10 – 20 kN) and the longitudinal acceleration (with accurate within 0,01g);
- measure the train speed with accurate within 2 – 3 km/hour;
- calculate the braking path with accurate within 10 – 20 metres;
- model the moving train which you can form using different types of carriages with different weights. You can use more than one locomotive and set them in different parts of the rolling stock;
- play back the front view of the traffic area, landscape, nearest buildings, constructions, traffic lights, kilometre posts and other facilities situated near with the railway track.



**Commercial Offer**

**of the Engineering and Design Specialized Department**  
**«Microprocessor-Based Control Systems and Safety**  
**in the Railway Transport»**  
**(EDSD MBCSS)**

**HARDWARE-SOFTWARE SYSTEM**

**«TRAIN DRIVER TRAINER-SIMULATOR»**

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## **EDSD «Microprocessor-Based Control Systems and Safety in the Railway Transport»**

Engineering and Design Specialized Department "Microprocessor-Based Control Systems and Safety in the Railway Transport" (EDSD MBCSS) is a subdivision of the Dnipropetrovsk National University of Railway Transport named after Ac. V. Lazarian.

Main goals of EDSD MBCSS are the development of hardware-software system "Train Driver Trainer-Simulator" – which is intended to teach the train drivers to the safety and energy-efficient modes of the train driving – and development other teaching and simulating program systems.



We always ready to offer You the profitable conditions for goal attainment!

## Why You should choose EDSD “Microprocessor-Based Systems and Safety in the Railway Transport”?

- Staff of EDSD MBSS are really experienced and skilled workers in field of SMART and digital technologies for modelling the mechanical, dynamical and electrical processes in industry.
- Our experience makes it possible to develop the high-quality teaching machines which help your stuff to optimize and improve their work.
- Over a long period of time our stuff have designed and made hardware-software system “Train Driver Trainer-Simulator”. This teaching and intelligent system takes into consideration the mechanical and electrical parts of the train, its type and characteristics, the behaviours of dynamic, the speed, the train schedule, the road surface and other indices. They *analyze*, *choose* and *teach* the train drivers to most effective and energy saving modes.
- All our devices are made using state-of-the-art technologies and materials. We follow the innovations and continue to improve our products.
- The exchange program with other companies of worldwide reputation helps us to use numerous developments and standards in our products.
- Our hardware-software system is protected by copyright.
- “Train Driver Trainer-Simulator” is used by numerous locomotive depots and educational centres of Ukraine and some foreign countries.

### ***Experience of driver trainers using shows the next:***

- the period for the professional preparation of youth and retraining of old drivers becomes shorter, more effective and easier;
- increased the driver’s craftsmanship, the safety and energy-saving in transportation;
- drivers studied actions in unconventional and emergency situations which can’t be modelled in real life;
- in time of work, drivers can quickly find and eliminate all faults in the train;
- increased the objective evaluation of driver’s skills and actions in modelled situations;
- it stays possible to prepare personal to work with new locomotives and equipment.

## Hardware-Software System «Train Driver Trainer-Simulator»

Trainer-simulator consists of the two work places such are an instructor's and train driver's workbenches. Both places have personal computers which are linked together using the local area network.

Projection Screen

Instructor's Workbench

Train Driver's Workbench

With the Control and Indicative Devices



### *Train driver's workbench includes the next:*

- locomotive panel which has all measuring, control, indication and signal devices;
- video system which shows the front view of the traffic area;
- additional video system which displays the schemes of the electrical and air-operated locomotive systems;
- audio system plays back sound effects which arise in time of train operation;
- real or virtual model of the braking system;
- coupling arrangements with real locomotive control devices.



### *Instructor's workbench has personal computer which can:*

- *prepare, save and control* the databases about locomotives, carriages, train schedule, road surface and results of the training tests;
- *form* the training test, *give advice, analyse* results and *complete* the objective summary about driver fails and skills;
- *preliminary calculate* the most effective (energy saving) mode using all parameters of locomotive, conditions of moving and other indices.

### ***Software of trainer can do the next:***

- *save, store and control* databases about trains, its schedule, conditions, settings and results of training tasks;
- *calculate* optimal (from the position of energy-saving) modes of trains and *take into consideration* the parameters of train, conditions, road surface, speed limits and observance of traffic regulations;
- *control* the traffic conditions in the process of the task simulation, for example: control the light signalling system (LSS), change the track of moving in the railway stations, put obstacles in the track, change the weather and time of the day;
- *simulate* the widely-distributed fails in the locomotive and the light signals which can be repaired in the journey by driver and his assistant;
- *model* the locomotive control and power system. Driver can control them using the measuring equipment and the display devices which show the parameters in real time;
- *model* the air brake system and the air distributors in different modes for the freight, passenger trains and carriages;
- *model* the longitudinal dynamic of the trains and *estimate* the maximal value of the longitudinal dynamical stresses in the train (with accurate within 10 – 20 kN) and the longitudinal acceleration (with accurate within 0,01g);
- *measure* the train speed with accurate within 2 – 3 km/hour;
- *calculate* the braking path with accurate within 10 – 20 metres;
- *model* the moving train which you can *form* using different types of carriages with different weights. You can *use* more than one locomotive and *set* them in different parts of the rolling stock;
- *play back* the front view of the traffic area, landscape, nearest buildings, constructions, traffic lights, kilometre posts and other facilities situated near with the railway track.

***The journey results can be shown in the form of text or diagram.***

This information helps an instructor and gives full and objective evidence about actions of the driver over a period of a training task.

**Journey results show the next data:**

- general information about a journey (date, driver's name, section name, train parameters, train number, dispatch station, receiving station and train schedule etc.);
- calculated data about journey (total time of journey, average speed, optimal energy consumption, information about inspection of braking system which includes starting and finishing braking speed, fixed and calculated braking path etc.);
- primary results (overheating of traction motors or generators, data about inspection of braking system which includes effectiveness, average braking speed, specific energy consumption etc.);
- information about train operation in the station-to-station blocks (energy consumption and time, total energy consumption over a period of journey, total period of journey etc.);
- violation of rules (violation of the speed limits which shows the position of it; violation of the longitudinal dynamic stress limits and accelerations in the train; running through stop signals; brake down driver's vigilance etc.).

***Parameters which are shown in the graphical form include the following:***

- traffic lights;
- vertical alignment of the road;
- variation of the longitudinal tension or pressing forces in the freight train;
- variation of the acceleration forces in the carriages of the passenger or suburban trains;
- record of the traction and regenerative braking currents;
- speed of the train;
- optimal trajectory;
- speed limits;
- pressure in the braking cylinders and the running notch indicator of locomotive throttle.

This form of results makes it possible to analyze, firstly, the traffic situation, secondly, the actions of the train driver (for example: the variation of the traction or regenerative braking current, the pressure in the braking cylinders etc.), and thirdly, the forces of train reaction (speed, longitudinal stresses etc.).

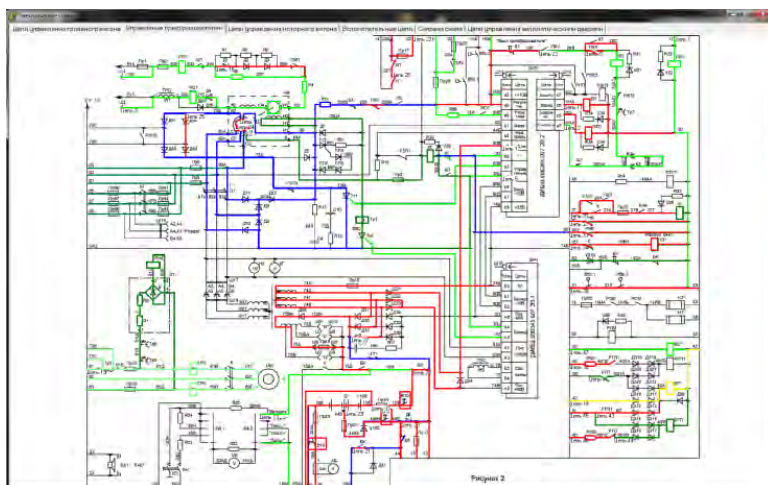
***In addition, the train driver trainer helps You to investigate the following questions:***

- *analysis* of train control capability (getaway forces of freight locomotives, running through the slope parts of the road, estimate the braking length in different modes etc.);
- *investigation* the influence of the traffic conditions (the slope of the track, speed limits etc.) and the train parameters (weight, length, types of carriages etc.) on the current consumption in different sections of the road;
- *evaluate* the longitudinal stress loading of any train in the process of its operation in the real road and *provide* necessary security procedures in emergency situations;
- *estimate* the stability of each carriage to longitudinal forces which influence to the train.

We can produce the train driver trainer of any vehicles type for any section of the road. Our product allows to solve the real problems which include not only traffic safety, saving of energy consumption or something else in the road but also preparation, retraining and certification of your new, untrained, really experienced or professional drivers and their assistants.

The Hardware-Software System "Train Driver Train-Simulator" was highly appreciated by our customers from locomotive sheds of Slaviansk, Charkiv, Melitopol, Znamianka, Nyzhnedniprovs'k-Vzol, Yasynovato, Lviv, Dnipropetrovsk (Ukraine), and in the training centres of Iran and Lithuanian Railways

## Software System for Visualization and Observation of Electrical and Pneumatic Systems of Vehicle



Our driver trainer can be completed with software system for visualization and observation of electrical and pneumatic systems of the vehicle. You can use it together with driver trainer-simulator or like separate software system. In the first case, the drivers study electrical and pneumatic schemes in the process of train operation. But in the second case, studying of these locomotive schemes runs separately from driving process

and all equipment can be controlled using virtual or real locomotive control panels.



Usage of this hardware-software system allows to teach the operation of the power, support and control circuits of the locomotive in different modes and, it goes without saying, the operation of the train breaking system.

## Warranty

Trainer-simulator warranty period is three years. In this period all reasonable claims of client will be defaulted at manufacturer cost. Warranty service also includes free professional consultations.

## Our Clients

- Iranian Railway
- Prydniprovsk Railway
- Odessa Railway
- Pivdenna Railway
- Donetsk Railway
- Lviv Railway
- Lithuanian Railway

## Our Contact Information

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Our web pages: <http://Sktbmsum.ucoz.ua>  
<http://ndch.diit.edu.ua/innovative/trenazhernyy-kompleks-mashinista-lokomotiva.html>

Video presentations You can find using the next links:

[http://youtu.be/j6MPf\\_MK5Mk](http://youtu.be/j6MPf_MK5Mk)

<http://youtu.be/T8vhiXAHVn0>

### Packaging

<b>Driver's Workbench:</b>	<b>Packaging and Price</b>					
case of locomotive control panel	If Parts are Given by Client		If Parts are Given by Manufacturer		Simulator "Compact"	
REAL measurement devices of the panel	+	-	+	-	-	-
REAL command units	+	-	+	-	-	-
VIRTUAL measurement devices of the panel	-	+	-	+	+	+
VIRTUAL command units	-	+	-	+	+	+
coupler with the REAL command unit of the locomotive	+	-	+	-	-	-
<b>Breaking System:</b>						
brake equipment	+	-	+	-	-	-
software which simulates the brake equipment	-	+	-	+	+	+
<b>The View of the Traffic Area<sup>1</sup></b>						
the real view (equals 100 km)	+	-	+	-	+	-
traffic area with unconventional and emergency situations <sup>2</sup> (equals 20 km)	-	+	-	+	-	+
<b>Personal Computers:</b>						
driver's workbench	+		+		+	
instructor's workbench	+		+		+	
simulation of the control devices	-	+	-	+	-	+
simulation of the equipment	-	+	-	+	+	+
<b>Software</b>						
database of the railway blocks	+					
database of the locomotive types	+					
database of the traffic areas <sup>3</sup>	+					
database of the sounds	+					
database of the train schedules	+					
database of results	+					
calculation of energy-saving modes	+					
possibility to change the basic view settings	+					
possibility to change the basic sound settings	+					
possibility to change the parameters of the control devices and equipment	-	+	-	+	+	+
<b>Additional Software:<sup>6</sup></b>						
electric scheme	yes/no					
pneumatic scheme	yes/no					

<sup>1</sup>The view from the locomotive cab.

<sup>2</sup>Schemes, lengths and numbers of the station-to-station blocks are chosen by requirements list.

<sup>3</sup>For adding the new areas in future.

<sup>4</sup>Is specified after the specification of the requirements list.

<sup>5</sup>Simplified version intends for the group training. The price is written only for one of ten places. It is possible to use one workbench for the different locomotive types.

<sup>6</sup>It intends for the interactive teaching.



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**EDSD MBCSS “Microprocessor-Based Control Systems and Safety in the Railway Transport”**

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