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PREPARING DRIVERS FOR EXTREME SITUATIONS ON THE ROADS OF THE FAR NORTH

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Abstract

In the twenty-first century, despite a wide range of measures taken to ensure transport safety and security thousands of people continue to die on the roads in Russia and world every year. At the same time, people often die not only in road accidents, but, for example, in situations such as an incorrect crossing by a car ford through a water obstacle, a car breakdown in an area with a large gap between settlements and a rare movement of cars at low street temperatures, etc. The study proposes an original methodology for preparing non-professional drivers for driving on the roads of the Far North in difficult climatic and infrastructural conditions. The main task of applying the proposed method is to reduce the number of accidents on the roads of the Far North when non-professional drivers move long distances in extremely low temperatures and difficult weather conditions, such as snowfall, wind, etc. Based on the results of the experimental operation of the complex, the author has formed a recommended format for passing the route, with the use of which it is recommended to form groups of students and the number of tasks.

Keywords: Road, traffic, safety, driver

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1. Introduction

In the twenty-first century, despite a wide range of measures taken to ensure transport safety and security (Faramondi & Setola, 2019; Luxton & Marinov, 2020; Polunsky, 2017; Shvetsov, 2021; Shvetsova & Shvetsov, 2020; Stewart, 2010), thousands of people continue to die on the roads in Russia and world every year (Tables 01, 02).

Table 1. Statistics of fatalities on the roads of Russia in the period of 2010–2019

Year	The number of accidents (thousand)	The number of dead (thousand)	The number of wounded (thousand)
2010	199. 4	26. 5	250. 6
2011	199. 8	27. 9	251. 8
2012	203. 5	27. 9	258. 6
2013	204. 0	27. 0	258. 4
2014	199. 7	26. 9	251. 7
2015	184. 0	23. 1	231. 1
2016	173. 7	20. 3	221. 1
2017	169. 4	19. 0	215. 3
2018	168. 0	18. 2	214. 8
2019	133. 2	13. 5	171. 3

At the same time, people often die not only in road accidents, but, for example, in situations such as an incorrect crossing by a car ford through a water obstacle, a car breakdown in an area with a large gap between settlements and a rare movement of cars at low street temperatures, etc.

2. Problem Statement

This is explained, first of all, by the fact that the peculiarities of Russian roads, especially in the regions of the Far North, are still the following factors: poor quality of roads and a lack of road infrastructure (bridges, road signs and signs, lighting, etc.); sections of highways between settlements, reaching hundreds of kilometers, and on which there are practically no gas stations, food points, traffic police posts, etc.; low outdoor temperature, which reaches –50˚ in winter (Figure 01); the presence of long sections of roads with no signal from cellular operators, which does not allow calling for assistance in an emergency. Getting into an emergency in such conditions threatens with serious consequences up to the death of the driver and passengers of the vehicle (Faramondi & Setola, 2019; Luxton & Marinov, 2020; Shvetsov, 2021).

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Table 2. World statistics of fatalities on the roads, 2018 (International Road Safety Comparisons—Annual, 2020)

Nation	Road deaths	Fatality rate per 100,000 population
Norway	108	2.03
Switzerland	233	2.74
United Kingdom	1 839	2.77
Ireland	140	2.88
Denmark	171	2.95
Sweden	324	3.18
Japan	4 166	3.29
Israel	316	3.56
Spain	1 806	3.86
Netherlands	678	3.93
Germany	3 275	3.95
Finland	239	4.33
Slovenia	91	4.40
Australia	1 134	4.54
Austria	409	4.63
Slovak Republic	260	4.77
France	3 248	4.85
Canada	1 804	4.87
Estonia	67	5.07
Iceland	18	5.10
Belgium	604	5.30
Italy	3 334	5.52
Luxembourg	36	5.92
Lithuania	173	6.18
Czech Republic	658	6.19
Hungary	629	6.44
Greece	700	6.53
Portugal	675	6.56
Korea	3 781	7.32
Poland	2 862	7.45
Latvia	148	7.68
New Zealand	377	7.72
Turkey	6 675	8.20
Chile	1 955	10.43
United States	36 560	11.17
Colombia	6 476	13.00

3. Research Questions

Figure 1. Difficult weather conditions in the Far North (SakhaTimes, 2021)

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Often, having got into an emergency on the roads, people do not know the possible options for solving it, which leads to tragic incidents, preparedness for action in such emergencies would help to avoid this

4. Purpose of the Study

The author, as one of the measures for solving the indicated problem, have developed an educational complex for training drivers for emergency situations on the roads of the Far North (hereinafter referred to as the complex) and the methodology for its application. First of all, the use of this complex is relevant for the training of drivers in regions with long sections of highways between settlements and difficult weather conditions, such regions include the Siberian and Far Eastern federal districts of the Russian Federation.

5. Research Methods

Educational complex for training drivers for emergency situations on the roads of the Far North

The main element of the complex is a removable floor covering with an image of the road. The pavement with a size of 9x3.5 meters can be deployed to conduct classes in any suitable size room or in outdoor conditions on an asphalt concrete site.

The second element of the complex is a model of a Toyota Land Cruiser Prado passenger car (size 1:16) (Figure 2) with a remote control, with which students pass the route.

Figure 2. Car model (RC Jeep Toyota Land Cruiser Prado Black 1:12-1050, 2021)

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The third element of the complex is a set of 30 tasks, each of which consists of a visual emergency model and its textual description. The tasks were formed using the method of expert assessments, while employees of such structures as the Ministry of Emergency Situations, the State Traffic Safety Inspectorate, Rostransnadzor, as well as teachers of the North-Eastern Federal University were involved as experts.

6. Findings

At the first stage of the expert survey, the experts were offered a questionnaire, in which 100 different emergencies on the roads of the Far North were entered (data on emergencies were formed on the basis of collecting and analyzing information about actual incidents). According to this table, the experts had to choose 30 situations that, in their opinion, should be applied in the tasks.

At the second stage of the survey, the experts were offered a second questionnaire, into which data on possible solutions in an emergency situation were entered, according to this table, experts were asked to express their consent or disagreement on the options for action in an emergency.

Based on the results of the expert survey, a set of test tasks was formed, consisting of 30 tasks and 3 solutions for each task, 1 of which is correct.

6.1. Methodology for using the complex

The methodology for using the complex in the educational process consists of four stages (Figure 03).

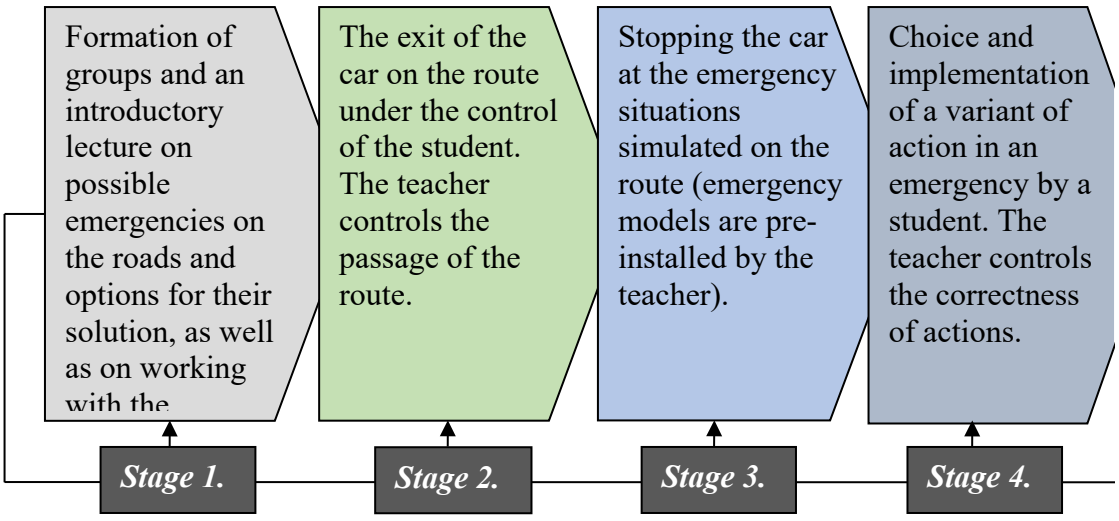

Figure 3. Methodology for using the complex in the educational process

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Based on the results of the experimental operation of the complex, the author has formed a recommended format for passing the route (Table 03), with the use of which it is recommended to form groups of students and the number of tasks.

Table 3. Route format

Number of groups	Number of participants in a group (no more)	Number of emergency situations on the route (no more)	Number of solution options
1-3	3	5	3
4-5	2	3	3
5-7	2	3	3

According to the results of passing the route, marks are given using an assessment scale (table 04).

A feature of the proposed method is that initially, students are invited to find the correct options for action in an emergency, only in the absence of such a teacher offers a set of possible solutions. This is aimed at developing the ability to make the right decisions in emergency situations.

Table 4. Grading scale

Number of emergency situations on the route	Number of solutions for each emergency	Total number of correct decisions	Evaluation (maximally +++++)
5	3 (1 of which are correct)	5	+++++
5	3 (1 of which is correct)	4	++++
5	3 (1 of which is correct)	3	+++
5	3 (1 of which is correct)	2, 1.0	++
3	3 (1 of which is correct)	3	+++++
3	3 (1 of which is correct)	2	++++
3	3 (1 of which is correct)	1	+++
3	3 (1 of which is correct)	0	++

7. Conclusion

The article proposes an educational complex for training drivers for emergency situations on the roads of the Far North and a methodology for its application. The statistics of emergency situations on the roads in the Russian Federation and in the world confirms the relevance of the proposed development. After completing training using the complex, students will have a set of necessary competencies that will allow them to find the right solution to emergency situations on the roads.

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