

UDC (УДК) 35.073.537:331.101.1](438)

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ІНТЕГРАЦІЯ ПРИСТРОЇВ У СЛУЖБОВИХ ТРАНСПОРТНИХ ЗАСОБАХ ПОЛІЦІЇ

Анотація. Написано в межах проекту «Розробка класифікації поліцейських транспортних засобів залежно від їх призначення та стандартизації центральної консолі транспортних засобів в обсязі облаштування та установки системи ІКТ та пристроїв керування сигналами спеціального призначення» № DOB-BIO7 від 04.02.2015 р. у сумі 4 058 789 польських злотих, який фінансується спільно з Національним центром досліджень і розробок у рамках конкурсу 7/2015 [1].

Важливою сферою функціонування поліції є безпека дорожнього руху. Діяльність поліції, спрямована на підвищення безпеки дорожнього руху, була одним з пріоритетів Головного начальника поліції упродовж 2016–2018 рр. [5]. Масштаб потреб, пов'язаних із забезпеченням безпеки дорожнього руху, можна вказати у співвідношенні з кількістю транспортних засобів на польських дорогах. У 2017 році в Польщі зареєстровано понад 29 мільйонів автомобілів [6]. Поліцейська статистика показує, що в 2017 році поліція повідомила про 32 760 дорожньо-транспортних пригод. Унаслідок цих ДТП загинула 2 831 особа, поранено 39 466 осіб. У 2017 році поліція повідомила про 436 469 дорожніх зіткнень.

Поліцейські транспортні засоби пристосовані до потреб служби, однак протягом багатьох років не вистачало комплексного підходу до безпеки, комфорту та ергономічності роботи, що виконується в поліцейських транспортних засобах. Віднедавна це швидко змінюється. Прикладом такого підходу можуть бути науково-дослідні проекти, про які повідомляє Міністерство внутрішніх справ та адміністрації, а також Головне управління поліції в межах зазначених конкурсів, оголошених Національним центром досліджень та розвитку. Одним із таких проектів є «Розробка класифікації поліцейських транспортних засобів залежно від їх призначення та стандартизації центральної консолі транспортних засобів в обсязі облаштування та установки системи ІКТ та пристроїв керування сигналами спеціального призначення», № DOB-BIO7 від 04.02.2015 р., який має на меті уніфікувати центральну консоль транспортного засобу для встановлення ІКТ пристроїв у місцях, пристосованих до цього у службовому автомобілі.

Цей проект реалізується з грудня 2015 року Вищою школою поліції в м. Щитно, Варшавським інститутом автомобільного транспорту ТзОВ «Marvel» (м. Лодзь).

У межах цього проекту в грудні 2016 року проведено опитування групи з 354 офіцерів довільно вибраних поліцейських підрозділів. Метою дослідження було виявлення думки поліцейських щодо ергономіки та безпеки транспортних засобів, в яких вони виконують свої обов'язки. Респондентів запитували про їхню думку щодо безпеки та ергономічності спеціалізованого обладнання, що використовується у цей час, встановленого на транспортних засобах серійного виробництва. Кількість транспортних засобів, які використовуються польською поліцією, становить понад 21 000. Респондентам було задано 22 питання про безпеку. Деякі з них стосувалися безпеки пристроїв, встановлених у службових автомобілях. Усі поліцейські автомобілі є обладнані радіостанціями, а більшість з них – пристроями, що управляють світловими і звуковими сигналами. Так, респондентів запитували про безпечне використання цих пристроїв під час виконання їхніх обов'язків. Зазначено результати опитувань.

Ключові поняття: інтеграція, безпека, поліцейські службові транспортні засоби, зручність, ергономічний.

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INTEGRATION OF DEVICES IN POLICE DUTY VEHICLES

Abstract. The article was written in the framework of the project entitled «Development of Police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT system and control devices of special purpose signals» DOB-BIO7/04/02/2015 with the value of PLN 4 058 789, co-funded by the National Centre for Research and Development under the contest 7/2015 [1].

An important area of the Police functioning is road safety. Police activities targeted at improving road safety were one of the priorities of the Head Police Chief for the period of 2016–2018 [5]. The scale of needs associated with the provision of road safety can be referred to in correlation to the number of vehicles that commute on Polish roads. In Poland, in 2017, more than 29 million motor vehicles were registered in total [6]. The Police's statistics show that in 2017, the Police reported 32 760 road accidents. As a result of these road accidents, 2 831 people were killed, and 39 466 people were wounded. In 2017, the Police reported 436 469 road collisions.

Police vehicles are adapted to the needs of the service, however, for numerous years there was a lack of a comprehensive approach to safety, comfort, and ergonomics of work performed in police cars. In recent years, it has been changing rapidly. An example of this approach may be the research projects reported by the Ministry of Internal Affairs and Administration and Polish Police Headquarters for the subsequent competitions announced by the National Research and Development Centre. One of such projects is the project entitled «Development of Police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT system and control devices of special purpose signals», no DOB-BIO7/04/02/2015, which aims to standardize the central console of the vehicles to enable installation of communication and ICT equipment in places adapted for this in official vehicles.

This project has been implemented since December 2015, by the Police Academy in Szczytno, Industrial Automobile Institute from Warsaw and Marvel SP. z o.o. in Łódź.

In the framework of this project, in December 2016 surveys were carried out on a group of 354 officers of several randomly selected police units. The aim of the research was to identify the police officers' opinions about the ergonomics and safety of vehicles in which they perform their duty. Respondents were asked about their opinions on the safety and ergonomics of the specialised equipment currently used, mounted to serially produced vehicles. The number of vehicles presently exploited by Polish Police is more than 21,000. Respondents were asked 22 questions about safety. Some of the questions were about the safety of devices installed in official vehicles. All Police vehicles are equipped with radio stations and most of them – in devices managing the light and sound signals. Hence, respondents were asked about the safe use of these devices during the execution of their duties. This article presents results of surveys.

Key concepts: integration; security, Police duty vehicles, comfort, ergonomic.

DOI 10.32518/2617-4162-2019-1-63-68

Introduction

It has been known since the 1950's, that security is included in the basic human needs [2]. In the 21 st century, perception of the concept of security changed. The attack on World Trade Centre towers, hybrid warfare in Ukraine, the migration crisis in Europe allow to conclude that, at present,

safety is the most important human need. Safety is not everything, but everything without safety is nothing [3] is a popular statement which seems to cover the contemporary understanding of security. It is not only about understanding the concept of security at the macro level, as the security of the Member States, but also the safety of an entity.

1. Present day

This comprehension of security has gained significant importance. One of the most important formations responsible for safety in local communities is the Police. In Poland, the Police is responsible for the protection of life and health, safety and public order, initiation and organization of preventive measures, and obviously also for the prosecution of the committers of crimes and offences [4].

An important area of the Police functioning is road safety. Police activities targeted at improving road safety were one of the priorities of the Head Police Chief for the period of 2016–2018 [5]. The scale of needs associated with the provision of road safety can be referred to in correlation to the number of vehicles that commute on Polish roads. In Poland, in 2017, more than 29 million motor vehicles were registered in total [6, p. 1]. The Police's statistics show that in 2017, the Police reported 32 760 road accidents. As a result of these road accidents, 2 831 people were killed, and 39 466 people were wounded. In 2017, the Police reported 436 469 road collisions [6, p. 2–3].

Road safety is determined mainly by the behaviours of road traffic participants, including drivers of vehicles. These behaviours are however influenced by road solutions and vehicle design that may help drivers make the right decisions in critical situations on the roads or reduce the effects of committed faults [7]. Vehicles used by police officers are equipped with additional devices that are designed to improve the efficiency of the served duty. In this context, it is very important for additional equipment of the vehicles not to decrease the security of their users. Therefore it is vital that these devices are integrated in such a way, so as to limit the number and size of devices located in the cab of the vehicle, which in the event of road accident increase the risk of harm to the driver and passengers of the vehicle.

The services responsible for security, including Polish Police attach increasing attention to ensuring the safety of officers during the performance of their daily duties. This is not an imaginary concern, for every year dozens of police officers are killed or seriously injured as a result of the random events caused by performance of duties. Chases, patrolling the areas of cities which are especially at risk, overcoming thousands, and even millions of kilometers during the daily duty results in communication accidents. In its report, The Supreme Chamber of Control noted that the Police requires the provision of appropriate operating conditions, including access to the transport equipment. However, the daily duty of police officers is not performed in comfortable nor in safe conditions [8]. Every vehicle user is able to answer the question, what can happen during the accident with devices mounted inside the car.

Photography no. 1 shows the interior of a vehicle used to patrol, among others, motorways and expressways, where speeds attained by a vehicle are significant.



Phot. 1. Interior of the vehicle of the Alfa Romeo 156 brand, source: <http://www.gazeta.policja.pl/dokumenty/zalaczniki/7/789035.jpg>

Police vehicles are adapted to the needs of the service, however, for numerous years there was a lack of a comprehensive approach to safety, comfort, and ergonomics of work performed in police cars. In recent years, it has been changing rapidly. An example of this approach may be the research projects reported by the Ministry of Internal Affairs and Administration and Polish Police Headquarters for the subsequent competitions announced by the National Research and Development Centre. One of such projects is the project entitled «Development of Police vehicles classification depending on their purpose and standardization of the central console of vehicles in the scope of arrangement and installation of ICT system and control devices of special purpose signals», no DOB-BIO7/04/02/2015, which aims to standardize the central console of the vehicles to enable installation of communication and ICT equipment in places adapted for this in official vehicles [9].

2. Results of social research

This project has been implemented since December 2015, by the Police Academy in Szczytno, Industrial Automobile Institute from Warsaw and Marvel SP. z o.o. in Łódź.

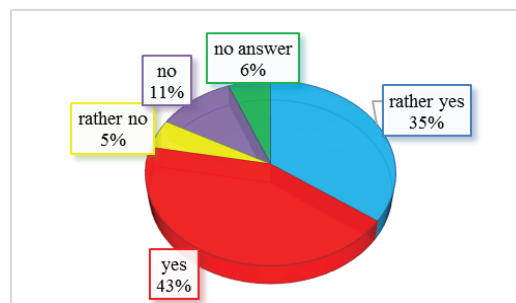


Figure 1. The safety of the radio use during the execution of duties $n=354$, Source: research executed in the framework of the project no. DOB-BIO7/04/02/2015

In the framework of this project, in December 2016 surveys were carried out on a group of 354 officers of several randomly selected police units. The aim of the research was to identify the police officers' opinions about the ergonomics and safety of vehicles in which they perform their duty. Respondents were asked about their opinions on the safety and ergonomics of the specialised equipment currently used, mounted to serially produced vehicles. The number of vehicles presently exploited by Polish Police is more than 21,000. Respondents were asked 22 questions about safety. Some of the questions were about the safety of devices installed in official vehicles. All Police vehicles are equipped with radio stations and most of them – in devices managing the light and sound signals. Hence, respondents were asked about the safe use of these devices during the execution of their duties.

A total of 16% respondents stated that the way in which the radio station is mounted does not allow for simultaneous safe and efficient use while driving. In turn, a total of 78% respondents considered the location of the radio station as allowing safe and efficient use of it.

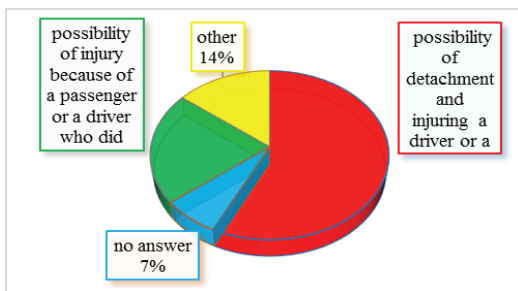


Figure 2. The risks related to the current place of radio station installation n=354, Source: research executed in the framework of the project no. DOB-BIO7/04/02/2015

57% of respondents feared the possibility of detachment of radio stations and injuring the driver or passengers. In turn, 22% of respondents thought that there was a possibility of injury caused by the passenger or driver who had not fastened safety belt.

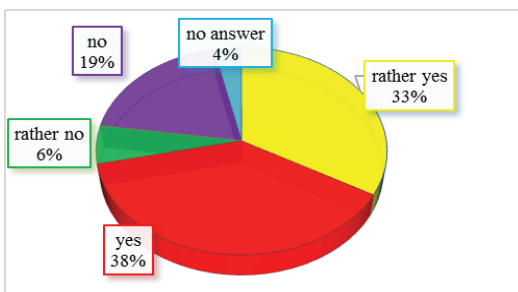


Figure 3. The safety of usage of the devices managing the light and sound signals during the execution of duties n = 354, source: research executed in the framework of the project no. DOB-BIO7/04/02/2015

A total of 24% of respondents had concerns regarding the place of installation of the device managing the light and sound signals.

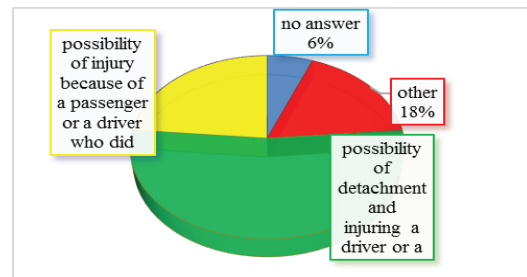


Figure 4. The risks related to the current place of installation of the device managing the light and sound signals n=354, Source: research executed in the framework of the project no DOB-BIO7/04/02/2015

53% of respondents feared the possibility of detachment of the device and injury to the driver or passengers. Another 23% of respondents thought that there was a possibility of injury caused by the passenger or driver who had not fastened the safety belt.

In official vehicles of specialist traffic officers, video recorders are mounted.

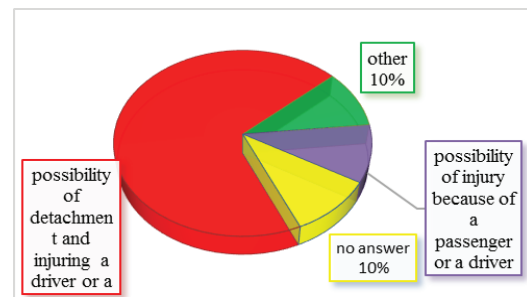


Figure 5. The risks related to the current place of mounting the video recorder n=354, source: research executed in the framework of the project no DOB-BIO7/04/02/2015

70% of respondents indicated concerns with the possibility of device detachment and the driver's or passenger's injuries. 10% of respondents also indicated the possibility of injury caused by a passenger or driver who had not fastened the safety belt.

Respondents were asked whether device integration could improve the ergonomics and safety of their daily service. The answers have been shown in the following diagram.

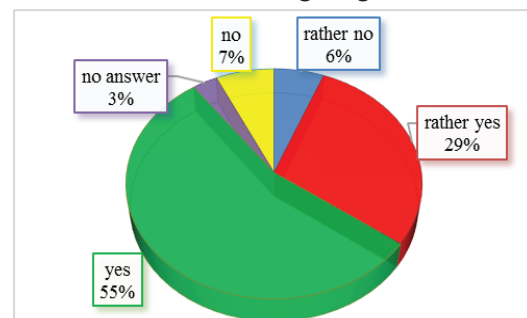


Figure 6. Is the integration of support of the devices installed in the vehicle into one control panel (touch screen) justified? Source: research executed in the framework of the project no DOB-BIO7/04/02/2015

A total of 84% of the surveyed police officers confirmed that this solution was justified. These results proved the validity of the development works, the goal of which was the integration of devices used by officers in the daily service.

The next diagram presents the advantages of devices integration according to the respondents.

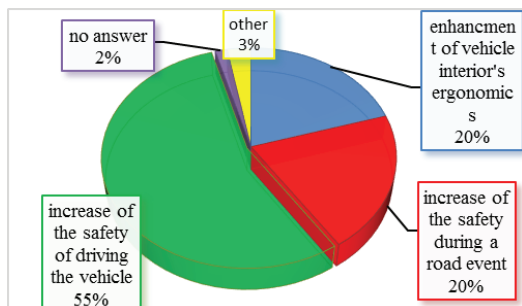


Figure 7. What is a reasonable integration of support of devices installed in the vehicle into one control panel? n=354, source: research executed in the framework of the project no DOB-BIO7/04/02/2015

The respondents paid attention to the improvement of the ergonomics (20%) and the improvement of the Security (75%).

Conclusion

The performed research shows that police officers are aware of the risks stemming from the device mounted to the vehicle and crucial for everyday service and they confirm the need to integrate these devices into one console. The radio station, preference lights, video recorder, modules reading license plates, and other devices serving the police in daily services, such as laptops, mobile terminals for credit cards, body cameras, are not yet the whole spectrum of devices that should be integrated. Other devices, with which the police will be equipped in the future should

be also foreseen. This extensive catalogue of devices overlaps with the complicated problem of balancing cars' electrical demand. Energy balance should give the opportunity to use these devices for a long time without the motor turned on, for example, during the service of road incidents, while securing crime scenes. Data collected by the onboard devices should ensure the possibility of their transmission, hence the need for a data transmission, recording and processing standards arises in the context of the integration of the devices in which the vehicle is equipped.

Another issue is the mutual interaction of devices and, of course, protection of data from the access of unauthorised people. All these activities should be fixed in the project, the implementation of which is foreseen by the end of 2018.

The following is a result of the existing design works:

- integration of the devices used in vehicles is desired by the users;
- the achievement of the objectives of the project will allow to significantly increase the level of safety of vehicles users
- improvement of the ergonomics of used devices will allow for the more efficient use of vehicles and their equipment;
- current legislation limits or hinders the ability to integrate devices with which the vehicles are equipped.
- currently, there are technologies enabling to modify the additional equipment of vehicles in such a way, so as to increase the safety and ergonomics level of official vehicles in usage.
- specification standard for vehicles purchased for the Police should enable an ergonomic and safe integration of additional equipment.

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*Стаття: надійшла до редакції 21.01.2019
прийнята до друку 25.02.2019*

*The article: is received 21.01.2019
is accepted 25.02.2019*