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NAVIGATION SEALS AND THEIR ROLE IN THE AUTOMATION OF
LOGISTICS SYSTEMS IN THE EURASIAN UNION
НАВИГАЦИОННЫЕ ПЛОМБЫ И ИХ РОЛЬ В АВТОМАТИЗАЦИИ
ЛОГИСТИЧЕСКИХ СИСТЕМ НА ТЕРРИТОРИИ ЕВРАЗИЙСКОГО
СОЮЗА

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Аннотация. В данной статье рассматривается применение навигационных пломб и их роль в автоматизации логистических систем на территории ЕАЭС. Изложено, как данная технология применяется и как с ее развитием может облегчить контроль за грузовыми потоками.

Annotation. This article discusses the use of navigation seals and their role in the automation of logistics systems on the territory of the EAEU. It is outlined how this technology is used and how, with its development, it can facilitate the control of cargo flows.

Ключевые слова: навигационная пломба, отслеживание, компания-перевозчик, безопасность.

Key words: navigation seal, tracking, carrier company, security.

Introduction. Route planning is one of the most complex and labor-intensive stages of the transportation process, creating additional challenges for drivers. Various situations may arise during a trip that the driver may not be aware of. Such situations include one-way streets, traffic restrictions, sharp turns, speed limits, construction work, detours, and new roads. During long trips, it is also important to consider the locations of gas stations, parking facilities, and other essential services. To address these challenges, modern transportation companies utilize various technical devices, among which navigation seals stand out.

Main part. A navigation seal is a technical device consisting of a sealing element and an electronic block []. It operates based on navigation system technologies and provides information transmission about the tracked object. The installation of such seals is carried out by customs authorities or the national operator ODO "Belneftegaz" at checkpoints upon entry into Belarus.

In Belarus, electronic navigation seals consist of a reusable electronic block and a sealing element. In some cases, special fastening devices developed by the national operator in accordance with customs requirements are additionally used for transportation within the country. In 2023, significant changes occurred in the legislation of the Republic of Belarus due to the entry into force of the Agreement on the Use of Navigation Seals for Tracking Transportations within the Eurasian Economic Union dated April 3, 2023 [2]. This agreement was signed by the heads of state members on April 19, 2022, in Moscow and covers only those transportations carried out across the territories of two or more Union countries. The main goal of the agreement is to minimize state control measures during the transportation of goods (including transit, export, and mutual trade) and to ensure their lawful circulation within the Union [3].

Navigation seals also optimise logistics processes, reducing delivery times and the number of physical checks en route. The relevance of using navigation seals for companies engaged in transportation and trade is associated with several advantages:

Table 1 - The role of navigation seals in the automation of logistics systems in the eurasian union

Roles	Description
Real-time location tracking	Allows for quick responses to unforeseen situations such as delays or accidents [4].
Cargo security	Provides immediate detection of cargo loss or theft, reducing financial and time risks.
Customer trust	Clients can be assured of their cargo's safety, enhancing loyalty to the carrier company.

The development directions for navigation seals are related to improving their technical characteristics and expanding their functionality. Key trends in using such devices include:

1. Reducing location determination errors: This can be achieved by

implementing multiple satellite systems such as GPS, GLONASS, and Galileo.

2. Integration with other systems and devices: Adding sensors for monitoring temperature, humidity, and vibrations expands cargo condition control capabilities.

3. Adoption of advanced information technologies: Utilizing big data and analytics for monitoring automation helps reduce risks associated with human factors [5].

Conclusion. Thus, navigation seal systems greatly simplify the work of transportation companies, especially drivers and logisticians. Thanks to the navigation seals project, drivers can perform their tasks faster and more efficiently. This increases the company's productivity and competitiveness in the market. Further development of navigation seal technologies is expected to improve service quality in logistics and increase customer confidence. The introduction of innovative solutions will contribute to the creation of more efficient supply chains and strengthen the positions of EAEU countries in the international arena.

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