

OPTIMAL SOLUTIONS FOR SPECIAL MACHINERY AND EQUIPMENT NORMS REQUIRED BY THE LATVIAN STATE FIRE AND RESCUE SERVICE

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Abstract. Technical progress covers all areas and is clearly related to special and technical equipment intended for performing fire fighting and rescue work. One of the objectives of the State Fire-Fighting and Rescue Service strategy is aimed at improving the quality of the services to be provided, including the implementation of a package of measures aimed at modernising the technical base. Which, in turn, will ensure the efficient performance of the functions and tasks identified and the use of useful resources, and will also provide staff with safer working conditions. The purpose of the study is to evaluate the spotlight of the regulatory documents regulating the norms of the special equipment provision in SFRS. Laws and regulations are an external form of expression of rights and an integral part of any democratic state. The updating of the regulatory framework, which determines the norms of special equipment in SFRS, was not carried out from 2011, but the range of special machinery and equipment changed significantly over a period of ten years. Within the framework of the study, an analysis of the existing regulatory framework, which determines the equipment necessary for fire-fighting and rescue work of SFRS, as well as special and technical equipment and the norms thereof, has been performed. The provision of SFRS with the special machinery and equipment necessary for carrying out the functions and tasks specified in regulatory enactments has been identified and evaluated. Methods used in the study: statistical and document analysis, observations. Practical calculations have been made and optimal solutions have been proposed based on the results of the calculations. The study results in the development of practically applicable material, the regulatory enactment, which determines the equipment necessary for fire-fighting and rescue work of SFRS, as well as the technical equipment and the norms thereof, for the project.

Keywords: fire safety, fire-fighting, civil protection, machinery, fire-fighting and rescue machinery and equipment.

Introduction

The improvement in the procedures for the operation of fire-fighting and rescue works of the State Fire and Rescue Service (hereinafter referred to as “SFRS”) have also changed the requirements for the necessary machinery and equipment. In order to ensure the continuous and full functioning of SFRS departments, to improve the effectiveness of their activities by ensuring the fulfilment of the functions and tasks specified in regulatory enactments and to improve the quality of the services to be provided by providing assistance to citizens in various hazardous situations, saving lives and material values, it is necessary, within the competence of the institution, to implement a complex of measures directed to improving the material and technical base for the efficient performance of the functions and tasks identified to ensure the maximum efficiency and usefulness of future use of resources, as well as ensuring safe working conditions for the staff.

It is therefore necessary to continue working on modernizing fire-fighting and rescue vehicles, equipment, special and technical equipment necessary for fire-fighting and rescue operations and updating their regulatory frameworks in line with today’s requirements. Moreover, the regulatory framework for this area has not actually been updated since 2011, but SFRS’ technical base is constantly being supplemented and has changed significantly over many years.

Regulatory enactments and other binding documents regulating the norms of machinery and technical equipment necessary to ensure the performance of the direct functions of the SFRS

Laws and regulations are an external form of expression of rights and an integral part of any democratic state. In order to understand the ways of changing regulatory requirements over the years, the authors examined existing regulatory documents and documents that have lost legal power over time.

The determination of the norms of the machinery and technical equipment necessary for fire-fighting and rescue work shall be delegated to the Cabinet in accordance with Section 25, Paragraph three of the Fire Safety and Fire-Fighting Law.

While identifying historical, field-regulating regulatory enactments, the authors of the article examined the Cabinet Regulation No. 280 of 13 April 2004 “Regulations Regarding Machinery, Special

and Technical Equipment Necessary for Fire-Fighting and Rescue Works and Their Norms”. The regulatory enactment determined the amount of machinery and technical equipment necessary to ensure operational activities. The requirements for the assemblage of fire-fighting and rescue vehicles with equipment and utilities were laid down separately. The assemblage of fire-fighting and rescue vehicles with equipment and utilities was performed in accordance with the requirements of LSS 334 “Special and technical equipment for fire-fighting and rescue works”. In addition, the regulatory document provided for mileage standards for vehicles (passenger cars, cross-country vehicles and buses). The regulatory document also provided for SFRS’ handling of vehicles having reached the mileage rate: such vehicles had to be sold at an auction or had to be written off. The document also included a very important point which provided for the provision of financing for the implementation of the provisions of this Regulation from the state budget resources allocated to the Ministry of Interior [1]. The regulatory document was created in the form of a table with explanations.

With the purpose of optimising the functioning of the SFRS system, a reorganisation was carried out in 2009 by bringing together the territorial teams in the regional centres, thereby ensuring a more efficient functioning of the system. The reorganization led to the creation of five regional centres. On the other hand, changes in the status of units changed the requirements for the machinery and technical equipment needed to perform the direct functions of SFRS, as well as their collateral requirements.

The Cabinet Regulations No. 280 of 13 April 2004 “Regulations Regarding Machinery, Special and Technical Equipment Necessary for Fire-Fighting and Rescue Works and Their Norms” were found to be not in conformity with the reorganised structure of SFRS, as well as it was concluded that the requirements laid down in the Regulations for the machinery, special and technical equipment for fire-fighting and rescue work and their norms do not comply with the requirements of that time.

The purpose of the draft new Cabinet regulations was to determine the machinery, special and technical equipment and the norms thereof necessary for fire-fighting and rescue operations following the reorganisation performed in the State Fire-fighting and Rescue Service, including in the regulations new upgraded equipment for fire-fighting and rescue works, which were successfully used by fire-fighting and rescue services in the European Union countries; and are functionally exonerated worldly.

The Cabinet Regulation No. 458 of 21 June 2011 “Regulations Regarding Machinery, Special and Technical Equipment Necessary for Fire-Fighting and Rescue Works and Their Norms” shall define the machinery, special and technical equipment necessary to the State Fire-Fighting and Rescue Service for performing fire-fighting and rescue works, as well as its norms. The structure of the regulatory document is set up in the form of a table with explanations. The machinery and technical equipment required by the SFRS are divided into three categories in the annex: transport vehicles, vessels and equipment, means of communication and special equipment. After the reorganisation, the means of communication and special equipment have been transferred under the supervision and balance sheet of the Information Centre of the Ministry of the Interior. In their study, the authors analysed the first two parts of the Annex to the Regulations.

In the Annex to the Cabinet Regulations, the units of SFRS are divided according to the following principle:

In Section 1, vehicles:

- Riga region management;
- divisions of the Riga region management;
- Riga region management department positions;
- territorial brigades;
- divisions of the territorial brigades;
- positions of the divisions of the territorial brigades;
- division (Fire Safety and Civil Protection College);
- independent and central units (management, departments, Technical Service Brigade, Operational Management Board).

In Section 2, vessels:

- divisions of the regional administration of Riga;
- divisions of the regional government of Riga;

- divisions of the territorial brigades;
- positions of the divisions of the territorial teams;
- division (Fire Safety and Civil Protection College).

Specific types of machinery and technical equipment and their number have been identified for each SFRS unit.

The vehicles referred to in the Annex to the Regulations of the Cabinet in force shall be assembled with equipment and utilities, taking into account the specific nature of the work of each unit of the SFRS and the special features of the location site (for example, residential area, infrastructure, terrain), unlike the invalid document, the requirements of which determined the Latvian state standard LVS 334 "Special and Technical Equipment for Fire-Fighting and Rescue Works" as mandatorily applicable.

Cabinet regulations provide for the possibility to purchase additional vehicles and vessels, as well as machinery and equipment for the provision of SFRS international assistance and the implementation of related projects. According to the requirements of the regulations in force, SFRS depo buildings are provided with the technical means necessary for the operation and maintenance of vehicles, vessels, machinery and technical equipment [2].

On the basis of the Cabinet Regulation No. 458 of 21 June 2011 "Regulations Regarding Machinery, Special and Technical Equipment Necessary to State Fire-Fighting and Rescue Service for performing Fire-Fighting and Rescue Works and Their Norms" the authors of the article have calculated the required number of vehicles and vessels in the State Fire and Rescue Service, in accordance with the norms set out in the Annex to the Regulations.

In conformity with the norms specified by the Cabinet, a total of 1604 vehicles and 130 vessels are necessary for the performance of the direct functions of the SFRS.

In order to ascertain the actual situation in the provision of SFRS with the machinery, special and technical equipment needed to provide fire-fighting and rescue work, the authors of the article have received and summarized information from the Board of the SFRS Technical Service.

The provision of SFRS on 31 October 2020 is 701 vehicles and 93 vessels. Analysing the activity reports of SFRS, it can be concluded that, in order to reach the number of vehicles specified in the Cabinet regulations, SFRS additionally requires 903 vehicles and 37 vessels. The question arises whether SFRS can actually carry out its direct functions fully, given that the provision for vehicles is 43.7% and, by means of vessels, 71.5% of the number specified in the regulations, or whether the standards specified by the Cabinet are too high? There is a probability that the collateral problem has occurred for a number of reasons.

The study includes a comparison of the number of vehicles and vessels present in SFRS in relation to the norms specified by the Cabinet. The data obtained suggest that the provision of SFRS 100% corresponds to the number specified by the Cabinet in only one of more than twenty positions - container carriers with equipped containers.

The experience of neighbouring countries

In the Republic of Lithuania, the number of vehicles needed for fire-fighting and rescue operations is determined by LIETUVOS RESPUBLIKOS VYRIAUSYBĖ, NUTARIMAS DNL PRIEŠAIRRINVAR SAUGOS UŽTIKRINIMO STANDARTO PATVIRTINIMO 2013 m. Balanchio 17 d. Nr.354 Vilnius PRIEŠGAISRINĖS SAUGOS UŽTIKRINIMO STANDARTAS.

The ruling No. 354 of the Saeima of the Republic of Lithuania from 17 April 2013 "On Approval of the Standard for Ensuring Fire Safety" with amendments from 27 December 2018, determines the minimum number of fire-fighting vehicles of the State Fire Safety Service in each municipality:

1. Light and medium-sized fire-fighting vehicles:
 - there is not less than one fire-fighting vehicle per 50 thousand inhabitants, but:
 - if there are more than 500 thousand inhabitants in the municipality - not less than one fire-fighting vehicle per 15 km²;
 - if the population density in the municipality is greater than 1 thousand inhabitants per 1 km² – not less than one fire-fighting vehicle per 10 km²;

- if the population density in the municipality is between 200 and 1 thousand inhabitants per 1 km² – not less than one fire-fighting vehicle per 50 km²;
 - if the population density in the municipality is not more than 200 inhabitants per 1 km² – not less than one fire-fighting vehicle per 350 km²;
 - in cities with resort status – not less than two fire-fighting vehicles;
 - if the local government meets more than one of the specified criteria, reference should be made to a lower number of tank-trucks.
2. Heavy Class fire-fighting vehicles:
 - for 60 thousand people not less than one fire-fighting vehicle, but:
 - if in the municipality the population is over 500 thousand - not less than one fire-fighting vehicle per 100 thousand inhabitants.
 3. A minimum national fire safety service shall be provided for the transport of substances in each area:
 - one water transporting vehicle or water transporting container with a capacity of not less than 10 m³ per 3 thousand km²;
 - an air foam transporting vehicle with a capacity of not less than 5 m³ – for each 5.5 thousand km² (other means of transport, which ensure the delivery of a specified quantity of substances at the site of event, may be used).
 4. The minimum supply of the national fire safety service shall be specified for ladder trucks or autolifts:
With a maximum working height of not less than 20 metres:
 - in each municipality, not less than one ladder truck or one autolift, but:
 - if the population density in the municipality is greater than 1 thousand inhabitants per 1 km² – not less than one ladder truck or one autolift per 60 thousand inhabitants;
 - if there are more than 500 thousand inhabitants in the municipality, not less than one ladder truck or one autolift per 100 thousand inhabitants;
 - if the local government meets more than one of the criteria laid down in these paragraphs of the Decision, a point determining a lower number of ladder trucks and autolifts shall be observed;
 - ladder trucks or autolifts with a maximum working height of not less than 35 metres must be located in municipalities where more than 20 residential buildings are situated, the highest (last) floor of which is above 30 metres.
 5. The minimum supply of the national fire safety service shall be provided for pumping stations with a capacity of not less than 6 thousand l/min in each local government – not less than one per 4 thousand km².
 6. The minimum supply of the national fire safety service shall be provided for fire pump vehicles carrying not less than 1500 m of fire hoses: not less than one for each pump station.
 7. The requirements regarding the number of other fire and rescue vehicles (railway cars, chemical rescue works, technical rescue works and other cars) necessary for the fire protection service shall be determined by the Ministry of the Interior (Fire Protection and Rescue Department). The list of vehicles needed for these fire and rescue operations is determined by the Director of the Fire Protection and Rescue Department.

For the State Fire Safety Service units located in a local government in which the grantroad surface is not less than 30 per cent of the total area or forests not less than 30 per cent of the total area of the local government, the number of fire-fighting and rescue vehicles shall be increased.

The number of cars required for municipal fire safety services shall be determined on the basis of the following criteria:

1. one vehicle – not less than 250 km², regardless of the tank class of the vehicle;
2. one vehicle – not less than 7 thousand inhabitants, regardless of the tank class of the vehicle;
3. if the difference in the number of cars calculated in accordance with the above points of the Decision exceeds 2 road tankers, the number of vehicles required shall be determined by the average number of tanks.

The number of spare road tankers shall be determined on the basis of the following criteria:

- a reserve of not less than 20 per cent road tankers per national fire-fighting service, providing at least one spare tank for each fire-fighting service team;
- in one municipal fire safety service not less than one road tank [8].

A programme for the development of internal security has been developed in the Republic of Estonia, in which the amount of technical equipment necessary for the rescue management of the Republic of Estonia is proposed to be evaluated taking into account the following factors:

- specific nature of the work of the rescue service unit and the special features of the location (infrastructure, terrain);
- resources in neighbouring countries that can be attracted if necessary (machinery, specialists);
- special machinery owned by businessmen what can be attracted if necessary.

The analysis shall assess what will be more cost-effective: entering into a contract with a merchant or purchasing the necessary techniques.

The main objective of the analysis is to find an optimal model for the use of technology, equipment and experience (knowledge), taking into account the resources of neighbouring countries, economic resources and own resources.

The document provides that, if necessary, the structural units of the Ministry of Interior, within the Ministry, may use the machinery of other structural units.

Great emphasis is on preventive measures to reduce the number of calls.

Vehicles with a 10-15-year depreciation are handed over to teams of volunteer firefighters. Systematic training of volunteer firefighters takes place in the Republic of Estonia. Teams of volunteer firefighters, unlike professional teams, only participate in fire-extinguishing but not rescue works. The document provides training for volunteer firefighters in the performance of rescue works, as well as the purchase of necessary equipment.

The balance sheet of the Estonian Rescue Board shall consist of 200 fire-fighting equipment units, 50% of which are older than 15 years. In addition, it is stated that 72 teams of professional firefighters are required in the country [9].

The authors conclude that the Republic of Latvia, the Republic of Lithuania and the Republic of Estonia have completely different approaches to determining the number of vehicles needed for fire-fighting and rescue operations.

In the Republic of Lithuania, the Saeima decision determines the minimum number of fire-fighting vehicles of the State Fire Safety Service in each local government. The number of fire-fighting vehicles will be determined on the basis of population per 1 km², the number of ladder trucks and autolifts shall be determined by reference to the height of the work, the population per 1 km², as well as the number of multi-storey buildings in the municipality. The requirements for another number of vehicles shall be determined by the Ministry of the Interior (Fire Protection and Rescue Department).

The Programme for the Development of Internal Security, developed in the Republic of Estonia, provides that the amount of technical equipment needed for the rescue management of the Republic of Estonia is to be determined by assessing: the specific nature of the work of the rescue service unit and the special features of the location (infrastructure, terrain), the resources in neighbouring countries that can be attracted if necessary (technical, specialists), the specialised equipment owned by merchants, which can be attracted if necessary. The analysis shall assess what will be more cost-effective: entering into a contract with a merchant or purchasing the necessary techniques. The main objective of the analysis is to find an optimal model for the use of machinery, equipment and experience (knowledge), taking into account all available resources.

Comparative statistical analysis of Latvia and neighbouring countries

As part of statistical analysis, statistical data from the CTIF “International Association of Fire and Rescue Services” has been studied, which includes information on the number of fires occurring in the world countries in recent years. According to the data, the number of fires in Latvia and neighbouring countries continues to decrease.

In Lithuania, the number of fires has decreased by 11.08% over five years, in Estonia – by 22.09% and the number of fires in Latvia – by 29.05%. The average number of fires in the Baltic States is between 4.08 and 5.34 fires per 1000 residents per year.

In order to carry out a full analysis, the authors have gathered information on factors that have a direct impact on statistical data. A comparative analysis of the size of the areas of the Baltic States was carried out, which makes it possible to better understand the difference in the number of fires between the countries: Lithuania has the largest population, the largest area of the country and the largest number of fires registered, respectively.

In analysing the resulting data on the number of fire stations and firefighters in the Baltic States, it has been found that the Republic of Latvia has the smallest number of stations – 92 stations compared to the rest of the Baltic States, while in the Republic of Estonia, despite a smaller area, a lower population and population density per km², the number of fire stations is about 99 stations higher than in the Republic of Latvia, the number of firefighters is therefore higher.

Given that the Republic of Latvia has the smallest number of fire stations among the Baltic States, the population and area per fire station are the highest, respectively. Compared to the Republic of Estonia, where there statistically are 6958 inhabitants per fire station, there are 20630 inhabitants per fire station in Latvia, which is almost 300% higher. On the other hand, compared to the area of the Republic of Lithuania, the indicator per fire station which is 182.92 km² and the indicator of the Republic of Estonia – 236.79 km² per fire station, there is 702.05 km² area in the Republic of Latvia per fire station, which is 383% higher compared to the Republic of Estonia and 296% higher than the indicator for the Republic of Lithuania.

The results of the analysis suggest that the Republic of Latvia has the highest number of registered fires per 1000 inhabitants, but the smallest number of fire stations and firefighters compared to the Republic of Lithuania and Estonia. In the Republic of Latvia, the population and area indicators per one fire station are three times higher than in the other Baltic States.

Provision analysis

SFRS currently has 91 fire stations for the provision of its functions. Over 20 station buildings have been built by 1940 and only 8 station buildings have been commissioned after 2012.

In conformity with the requirements of the regulatory enactments, 68 fire-fighting tank vehicles, 6 tower-ladders or other special equipment shall be required for the performance of fire-fighting and rescue work of SFRS in addition to existing special vehicles. Especially in recent years, SFRS has been actively renovating its fleet, replacing old Soviet-time cars with the cars corresponding to modern requirements. This does not significantly affect the increase in the number of cars as old cars are written off [3].

Over the five-year period 2015-2019, the technical provision for SFRS has improved, with 85 firefighters' special vehicles delivered during that period, while the total number of special vehicles is still insufficient to increase the operational capacity of SFRS. In order to inform about the current situation, an information report was prepared in 2017 "On the Purchase of Special Fire-Fighting and Rescue Vehicles and Special Equipment by the State Fire-Fighting and Rescue Service, Additional Personnel Needed to Ensure the Continuous Operation of Existing Units, As Well As the Construction, Reconstruction or Refurbishment of Fire Station Buildings and Additional Necessary Funding for 2018 and subsequent years". It was discussed at the meeting of the Cabinet of Ministers on 21 February 2017 (No. 7, § 42) regarding the purchase of special fire-fighting and rescue vehicles and special equipment needed by the institution, additional necessary personnel to ensure the continuous operation of existing units, as well as the construction, reconstruction or renovation of fire station buildings and additional necessary annual funding in the amount of 10 221 295 EUR, for the purchase of vehicles meeting modern requirements [3].

In order to inform the Cabinet of Ministers regarding the provision of SFRS with fire-fighting and rescue vehicles, their depreciation and technical condition, in 2020 an updated information report entitled "On the Ministry of the Interior long-term commitments for the purchase of special fire-fighting and rescue vehicles" project "Information report "On the granting of funding to the Ministry of the Interior for the purchase of special fire-fighting and rescue vehicles" was prepared. The updated

information report project reflects the actual coverage of SFRS with special vehicles and vessels. In describing the situation, frequent and long-standing repairs of outdated vehicles have been mentioned, problems with the purchase of spare parts, as factories often stop producing spare parts for vehicles which have been put into service before 1980. The technical specifications of vehicles manufactured more than 20 years ago do not meet modern requirements (inability to develop the required acceleration, fuel consumption is higher, compartments cannot accommodate all the equipment needed for rescuing and extinguishing fires); for these reasons, ageing vehicles often arrive at the scene later than modern vehicles, consume much more fuel and are physically unable to ensure that all equipment needed for rescue operations is delivered to the site of the event.

According to the results of the analysis of the data collected in the study, there are 113 special vehicles in use of SFRS for the beginning of 2021 with a lifetime not exceeding the useful life specified in the Regulations; 97 special vehicles are in service from 11 to 20 years; 42 special vehicles have been put into service 20 years ago; 69 vehicles are in the service range from 31 to 40 years, 23 vehicles are in use from 41 to 50 years and 2 trucks with a lifetime exceeding 50 years.

In accordance with the Cabinet Regulation No. 297 of 17 May 2016 “Procedures by which the State Fire-fighting and Rescue Service Performs and Manages Fire-Fighting and Rescue Works”, paragraph 6, after departure from the nearest SFRS station or post, a subdivision arrives at the site of the event: in the Republic city, town and village, where a station or a post of SFRS is located, within eight minutes, in the town, village, county and parish area, where a station or a post of SFRS is not located – within 23 minutes [4].

Technical tactical indicators of the subdivisions of SFRS do not comply with the modern requirements, since vehicles whose useful life has exceeded the time of use specified in the Cabinet Regulation No. 87 of 13 February 2018 “Accounting Procedures for Budget Institutions”, Annex 2, where the time of use for lorries, freight trailers, passenger cars and passenger car trailers is 10 years and such vehicles in the use of SFRS amount to 67% of the total number of lorries, so it is not guaranteed to provide the arrival time to meet the requirements.

As additional conditions which accelerate the depreciation of SFRS special vehicles are mentioned in the draft information report: heavy use of vehicles, poor road conditions, unfitted access routes to water-catching sites, off-road use of vehicles (e.g., when extinguishing thatch in early spring, fire-fighting vehicles not designed constructively for off-road use are often used) [5].

In evaluating the Cabinet regulations and Latvian State standards, the authors have concluded that the names of the special technical equipment (terminology) differ significantly.

The Cabinet regulations do not include requirements for equipment necessary for fire-fighting and rescue work, which is included in the State standard and is necessary for the completion of machinery. There is no reference in the Cabinet regulations, which would specify that the Latvian State standard is to be applied mandatory, so the requirements for equipment, with which special and technical machinery referred to in the Regulations is assembled, are not specified.

The Cabinet regulations include part of the necessary equipment for rescue work on water, which in turn is included in the Latvian State standard. Cabinet regulations and the Latvian State standard do not reflect the full range of necessary equipment for rescue work on water.

In order to meet the requirements specified by the Cabinet, it is necessary for SFRS to purchase 940 units of equipment necessary for fire-fighting and rescue work (903 vehicles and 37 vessels).

Between 2014 and 2018, the purchase of special fire-fighting and rescue vehicles amounted to 36.28 million EUR, which allowed 95 cars to be purchased. The new specialized vehicles are fully equipped with the most advanced rescue and extinguishing devices, as well as tailored for the needs of SFRS. Two aerial ladders and two fire tankers are scheduled to be purchased in 2021, with 38 road tankers expected to be received in 2022. In order to further renew and modernise the existing fleet, thereby significantly improving the existing provision of SFRS with the special vehicles needed to fulfil the basic functions of SFRS and to maintain the response capacity, additional funding is needed annually.

It is therefore necessary to continue work on the renewal of special fire-fighting and rescue vehicles, machinery, special and technical equipment needed for fire-fighting and rescue work and updating the regulatory framework according to modern requirements. Moreover, the regulatory framework in this

area has not actually been updated since 2011, but the fire-fighting and rescue services' technical base has been constantly being replenished and has changed significantly over many years.

Practical calculations to explain the situation

In order to understand why such a discrepancy has occurred between the current Service provision and the requirements specified by the Cabinet, calculations have been made within the framework of the study.

According to the requirements of the Cabinet regulations, there must be five fire tankers in each part of the Riga region administration. The posts of the divisions of the Riga region must be equipped with 2 road tankers per post. As well as the Cabinet regulations provide for a reserve for the Riga region – 4 road tankers.

According to the locations of the territorial units of 2020, the Riga Region Board has 13 divisions and 7 posts.

The number of fire tankers has been calculated according to the formula (1):

$$AC = \sum_{k=1}^n D_k + \sum_{j=1}^i P_j + C, \quad (1)$$

where AC – total number of fire tankers;
 D_k – number of divisions;
 P_j – number of posts;
 C – reserve.

The calculations carried out show that 83 fire tankers must be provided in the Riga Region administration. When studying the real situation in the Riga Region administration, it has been clarified that 62.65% of the number of fire tankers specified by the Cabinet can actually be placed in the Riga Region administration division and post garages.

Divisions and posts of territorial brigades, in accordance with the requirements of the Cabinet, shall be provided with 5 fire tankers per division and 2 fire tankers per post. The real situation in each territorial brigade and its compliance with the requirements of the Cabinet regulations were identified.

Calculations for the Zemgale Region brigade and a comparison of the result with the actual situation have been made. According to the calculation, the team must have 52 fire tankers, at present 80,77% of the number can be deployed, taking into account the fire station capacity. There is a similar situation in other territorial divisions.

The Vidzeme Region brigade must have 59 fire tankers; a real provision is 79.66% of the defined number of fire tankers.

According to the actual fire station capacity, the Kurzeme Region brigade must have 48 fire tankers, the provision is 79.17% of the number determined.

There must be 62 fire tankers in the Latgale Region brigade, in fact 77.42% of the number of fire tankers can be deployed in the station and post garages.

When compiling the results of the calculations, the authors of the article conclude that none of the regions may be by 100% provided by road tankers in accordance with the requirements specified by the Cabinet. The lowest indicator is in the Riga region – 62.65%, the provision of other regions with fire tankers, taking into account the capacity of station garages, could be met by 77-80% of the number provided for in the Cabinet regulations.

This situation has developed because the technical specifications of the fire stations have not been taken into account when drawing up the Cabinet regulations. Basically, a larger number of tankers cannot be physically deployed in the existing station building garages. It should be taken into account that in addition to fire tankers, other machinery is also present in the garages according to the specific location of the station (e.g., rescue vehicles, chemical emergency vehicles, etc.).

Mainly fire station buildings currently in use of SFRS have been constructed without taking into account LSS 361 “Installation of fire fighting and rescue service stations. General requirements”, which require that each fire-fighting and rescue service station must have 2 fire-fighting tankers and, in

addition, 50% of reserve fire tankers for stations located in urban or populated areas with a population of up to 50 thousand inhabitants and 100% of reserve fire tankers for stations located in urban or populated areas with a population of over 50 thousand inhabitants. Fire station buildings were not designed to place more than 4 fire tankers. Consequently, it is not appropriate to try to perform calculations on the basis of the experience of other countries, as we are limited to the capacity of fire station buildings.

It should be concluded that, purchasing the machinery in full, in accordance with the requirements specified by the Cabinet, it will not be possible to place the machinery in the garages of the fire station buildings.

Continuing the study, the authors found that on 6 April 2020 the Ministry of Interior issued the Order No 1-12/433 on Amendments to Order No 1-12/1947 of the Ministry of Interior of 21 December 2018 "On Requirements for the Installation of a Fire Station". The Annex to this Order contains guidelines on minimum requirements for the installation of a fire station. The requirements are applicable to the design and construction of the new station, as well as to the renovation, reconstruction or restart of the existing station. The guidelines specify that in future the new stations will be divided into four categories: A, B, C and D. The category of a station (including the number and types of transport units, as well as the number of duty shift personnel) will be determined by the State Fire and Rescue Service, taking into account the size of the service area, population, transport infrastructure in the service area, the number of sensitive and critical infrastructure facilities, building characteristics, potential risks to natural disasters and other factors likely to affect the performance of fire-fighting and rescue works.

The authors consider that the guidelines adopted the best conditions for the station deployment from neighbouring countries, but at the same time the guidelines contradict the requirements of the Cabinet regulations in force, by delegating the Service to determine the types and number of transport itself, as well as by determining the (reduced) number of vehicles for station categories, which does not correspond to the requirements of these Regulations (see Table 1).

Table 1

Comparative analysis of the specified number of machinery

Machinery, special and technical equipment	Cabinet Regulations No.458	MI guidelines	
	Riga regional administration divisions	Category of fire stations	
Fire tank	5	4	
Tower ladder or aerial ladder	1	1	
Rescue work motor vehicle	1	2	
Divers' motor vehicle	1		
Motor vehicle equipped with air foam extinguishing equipment	1		
Anti-smoke service motor vehicle	1		
Motor vehicle equipped with fire hoses	1		
Motor vehicles for chemical accidents	1		
Fire pump motor vehicle	1		
Motor-car or cross-country motor vehicle	1		
Operational headquarters motor vehicle	1		
Lorry or truck	1		
Trailer	4		
Off-road vehicle	2		
Motorcycle (including quadricycle and snow motorcycle)	4		
Total:	26		7

In performing the comparison of the largest number of machinery for one division specified in the Cabinet regulations with the largest number of machines for one division specified in the guidelines, the authors made sure again that in the design of the Cabinet regulations draft the capacity of fire station garages is not taken into account, so it would not be appropriate to follow the number of technical units indicated in this document. Inaccuracies in the Regulations give a misleading impression of the technical provision of the Service.

The authors of the article believe that until all fire station buildings in use of SFRS are constructed or rebuilt on a uniform basis, taking into account the same requirements directly in the matter of technical placement, the application of the requirements of the Cabinet regulations to calculate the number of machinery required by SFRS is not justified, because it will not reflect the number of technical units actually needed. The data resulting from the calculations should be adjusted according to the capacity of the fire station buildings. The authors would like to emphasise that, according to the requirements of the Regulations, 26 technical units must be located in each division of Latvian firefighters (see Table 1), of which 11 are special vehicles based on the chassis of trucks.

For such a large number of machinery, provision should be made not only for properly constructed fire station buildings, but also for a higher number of staff positions to ensure the use of this machinery for fire-fighting and rescue operations. The staff must be adequately trained to handle all specialised machinery. The implementation of all the above measures would require additional funding.

The machinery types covered by these Regulations and their norms do not meet the requirements of the Service. Taking into account the special nature of the construction of a fire station in use of the Service, it is not possible to use the same principle for the determination of machinery norms. The guidelines of the Ministry of Interior regarding the minimum requirements for the installation of a fire station have adopted the best conditions for the placement from neighbouring states, but at the same time the guidelines have been issued in contradiction with the Cabinet regulations, which prescribe the machinery, special and technical equipment necessary for the State Fire-Fighting and Rescue Service for the purpose of fire-fighting and rescue work and its norms, delegating the Service to determine the types and number of transport itself, as well as by determining for fire station categories the (reduced) number of machinery, which does not comply with the requirements of these Regulations. On November 3, 2020, the Cabinet conceptually supported the information report prepared by the Ministry of Interior "On Structural Reforms in the Interior Sector", which provides for the creation of administrative centres for the interior structures in 49 cities of Latvia and the construction of new buildings for rescuers and other services in five years' time. Construction of 50 new sites, including 43 Interior Service Centres, six separate fire stations and the building of the College of Fire Safety and Civil Protection has been envisaged.

The costs for the construction of the SFRS fire station are also calculated, with EUR 196 000 000 for the implementation of the project. Joint-stock company "UPB" has developed projects for four types of sites.

The above information leads to the conclusion that the division of fire stations into four categories in the Ministry of Interior guidelines will be implemented in the coming years and projects have already been developed for construction, which, according to the guidelines, will be able to accommodate less than the number of transport units specified in the Regulations.

The authors have identified the conditions for preparing legislative amendments. It is certainly necessary to assess what level of regulation would be appropriate for a specific situation. It should be borne in mind that drawing up any document has financial and administrative costs. And a huge number of regulatory frameworks cannot have a positive impact on citizens' attitudes towards public administration. Taking into account the number of necessary changes exceeding 50% of the current document, in this particular case a draft new legislative act should be drawn up.

For the legal settlement of the situation the authors offer two options.

Develop a new draft Cabinet regulation, specifying requirements for the types of machinery necessary for SFRS fire-fighting and rescue works and their norms in conformity with the capacity of fire station buildings.

As an alternative option, the authors offer to evaluate the possibility of making amendments to Section 25, Paragraph three of the Fire Safety and Fire-Fighting Law, which determines that the

machinery, special and technical equipment necessary for fire-fighting and rescue work, as well as its norms shall be determined by the Cabinet. The amendments should stipulate that the machinery, special and technical equipment necessary for fire-fighting and rescue operations, as well as its norms, shall be determined by the Head of SFRS or by the Minister of the Interior, on the basis of an analysis carried out by SFRS. Such delegation would allow for the development of a flexible framework that would ensure the ability of SFRS to respond to technological developments or the division of operational tasks between the departments of SFRS in a timely manner.

Selecting the first option, it should be noted that the information report of the Ministry of Justice entitled “Proposals for Reducing the Number and Volume of Amendments to External Legislation”, paragraph 2, states “With a view to improving the current situation, the legal system should be removed from the redundant legal framework, avoiding amendments on the first request” [6]. According to the authors, this aspect could lead to the harmonisation of the new draft rules for quite a long period of time. In view of the need to regularly review the standards for machinery, special and technical equipment, it should be noted that the harmonisation of the draft amendments may not be possible to be implemented operatively, on the first request.

In the alternative, according to the Cabinet Regulation No. 108 of 3 February 2009 “Rules for the Preparation of Draft Legislative Acts”, “the draft law, if necessary, includes a mandate for the national regulatory authority to issue an internal legislative act in order to ensure the implementation of the draft law” [7], the harmonisation of the draft amendments in the internal legislative document would be implemented more quickly.

For the preparation process of the draft regulation, the authors have chosen to offer a solution that does not require additional costs and could not only be used for calculating (determining) the number of machinery units required by the SFRS, but also for procurement planning, information reports, annual reports and other documents. In the opinion of the authors, the solution should be easy to understand, easy to use, based on the technical resources available to SFRS and not require in-depth knowledge in the field of information technologies.

The authors have identified the data necessary for achieving the aim and established a database including information on the types of special and technical equipment required, all types of machinery, special and technical equipment in use of SFRS, listed SFRS territorial and permanent structural units, information on the deployment of operational trucks (territorial unit, part or position of the unit), made and model, manufacture year and type of application, costs for the purchase of special and technical equipment (compiled from special and technical equipment supply contracts concluded in previous years by SFRS). For positions in which no purchase was organised before, the average market place was cleared up.

This information can be used not only for the preparation of the annotation of the new regulatory document, but also for the preparation of information reports and accounts, as well as for procurement planning. The implementation of the new draft rules will have a financial impact on the state budget, so it will be necessary to calculate the costs for the development of fixed capital by determining acquisition costs according to the nature and extent of the measures envisaged in the project. According to the authors, it is very important to base the calculations not only on the number of special and technical equipment specified in the regulations, which would result in 100% provision of SFRS with special and technical equipment, but also planning the substitution of the equipment that has exceeded the time limits specified in the regulations.

The information summary created in the course of the study makes it possible to quickly and easily complete all the calculations necessary for the preparation of the draft regulation, and it is possible, in the event of questions, to justify at any time the number of special and technical equipment units envisaged. The information summary may be used, depending on the decision taken by the management of SFRS, for the annex to any level of the regulatory document.

Conclusions

1. Within the framework of the study, a comparison of the number of vehicles and vessels of SFRS has been performed in relation to the norms specified by the Cabinet. The data obtained suggest that the provision of SFRS by 100% corresponds to a number specified by the Cabinet in only one

of more than 20 positions. According to the results of the analysis of the data collected in the study, there are 113 special vehicles in use of SFRS for the beginning of 2021 with a lifetime not exceeding the useful life specified in the Regulations; 97 special vehicles are in service from 11 to 20 years; 42 special vehicles have been put into service 20 years ago; 69 vehicles are in service time range from 31 to 40 years, 23 vehicles are in use from 41 to 50 years and 2 trucks with a lifetime exceeding 50 years.

2. The calculations indicate that none of the territorial units of SFRS may be 100% provided with fire tankers in accordance with the requirements specified by the Cabinet. The lowest indicator is in Riga region – 62.65%, the provision of other territorial units with fire tankers, taking into account the capacity of fire station garages, could be met by 77-80% of the number specified in the Cabinet regulations.
3. The guidelines of the Ministry of Interior adopt the best conditions for the placement from neighbouring states, but at the same time the guidelines contradict the requirements of the Cabinet regulations in force, by delegating the Service to determine the types and number of transport itself, as well as by determining to fire station categories the (reduced) number of machinery in non-conformity with the requirements of these Regulations.
4. The authors of the study believe that until all depo buildings in use of SFRS have been constructed on a uniform basis, taking into account the same requirements directly in the matter of technical placement, the application of the requirements of the Cabinet regulations for the calculation of the number of machinery required by SFRS is not justified because it will not reflect the number of technical units actually needed. The data resulting from the calculations should be adjusted according to the capacity of fire station buildings.

Author contributions

Conceptualization, V.P.; methodology, V.P., M.Z. and J.P.; validation, V.P.; formal analysis, V.P. and M.Z.; investigation, V.P. and M.Z.; data curation, V.P., M.Z. and J.P.; writing—original draft preparation, V.P.; writing—review and editing, V.P., M.Z. and J.P.; project administration, J.P.; funding acquisition, J.P. All authors have read and agreed to the published version of the manuscript.

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