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Inspection of public buildings based on risk assessment

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Abstract

Safety of public buildings has become an important issue for authorities after collapse of shopping centre in Riga, at 21.11.2013, where 54 people were killed. Safety of building is the practice of designing, constructing, operating, maintaining and removing buildings in ways that no one has deteriorated health, suffered injuries or died due to the use of the building. There are a lot of rating systems for sustainable building [1] in the worldwide, but there no such effective systems for rating of buildings according to their safety. This paper proposed a risk-based assessment system of public buildings with target to classify these in common way. The specific challenges of using such assessment for control purposes during of operation public buildings are highlighted in the work. There are also the first results of practical implementation of this method in Latvia. Based on the risk assessment there are also a new interactive approach for reporting of results for users of public buildings and stakeholders. The outcome of this research is accordingly a performance assessment tool that analyse the effect of risk factors to the safety of public buildings.

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Keywords: building inspections, public buildings, safety, assessment of safety, consequence class, risk factor, data reporting.

1. Introduction

Existing buildings in operation, if properly operated, are considered to be safe for people. Even these buildings are more than hundred year old, or so call heritage buildings [2]. However, due to technological progress, as well as changes in laws and regulations related to the integration in the European Union, the roles for both employees and maintenance staff regarding the use of public buildings are becoming more and more sophisticated. Existing buildings are designed according to the safety requirements of the decade they were built, however, today the requirements of the respective safety level are higher. New requirements have been introduced, the provision of which requires proper attention and resources of the owner [3], and nowadays the building safety requires special attention [4].

Some buildings depending on their time of construction in Latvia have different safety levels. Taking into consideration that users of the building expect the same level of safety there can be situations leading to severe

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accidents. In Latvia there are buildings in operation, most of which were built more than 20 years ago in accordance with the Soviet building norms (SNiP) [5]. Besides, there are also buildings which were built before 2010 in accordance with national building norms (LBN) [6] and there are also buildings built during the last 5 years already in accordance with the European Union's construction standards or Eurocodes (EC) [7].

Expectancy of human life is increasing and therefore it is especially important to assure the accessibility of buildings for the elderly people, as well as for disabled people or people with other health problems [8].

Earlier a lot of hygiene, health and environmental requirements, as well as energy economy [9] and the sustainable use of resources considerations were ignored, which shall be taken into account nowadays when making upgrades for existing buildings. Furthermore, the operational duration of the building is longer than life-time of any other system and equipment in the building, which means that the solutions of the building, their operation and safety lag behind up-to-date technologies. If the condition of existing buildings will not be improved in accordance with contemporary requirements and safety level, the number of accidents may rise. The following technical and social factors may accelerate the occurrence of accidents:

- depreciation of load-bearing structures;
- constructing engineering and networks in old buildings;
- incorporation of different new materials and construction products in an inappropriate manner;
- increase in the number of the elderly and disabled persons, and integration of disabled people into society;
- willingness to use the EU structural funds in an inappropriate manner.

Taking into consideration the above-mentioned circumstances, the Parliament of Latvia in the Construction Law [10], Article 21, Clause 4 has laid down the obligation of the owner of the building to provide proper maintenance of the building and its components during the operation thereof in the condition compliant with the essential requirements defined in the Construction Law, Article 9, Clause 4. These essential requirements are identical to the basic requirements defined by the European Parliament and EU Council Regulation Nr.305/2011 [11]:

- mechanical resistance and stability;
- safety in case of fire;
- hygiene, health and the environment;
- safety and accessibility in use;
- protection against noise;
- energy economy and heat retention;
- sustainable use of natural resources.

In order to meet the above-stated requirements, the responsibility of the building owner is to make sure that:

- the building is safe for its users and building maintenance staff,
- the building is being properly maintained;
- essential risk factors are evaluated during the use of the building;
- relevant improvement measures are carried out in accordance with the results of technical surveys.

The Parliament of Latvia in order to assure that the owner of the building complies with the mandatory obligations stated in the Construction Law has entitled building inspectors to monitor the operational compliance of buildings with the regulatory requirements. The control in public buildings*, which are expected to admit more than 100 people at the same time, paying special attention to the safety of the building, is performed by specially prepared building inspectors [10].

* Public building is building, where people receive a variety of services linked to education, recreation, shopping, work and a range of other social and economic matters [12]