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# 물류창고 화재안전을 위한 건축기준 개선방안

How to Improve Building Standards for Fire Safety in Logistics Warehouses

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SUMMARY

# How to Improve Building Standards for Fire Safety in Logistics Warehouses

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Logistics warehouses, classified under the Building Act as storage facilities, are essential for storing and handling large quantities of goods. Recently, there has been an increase in the construction of large-scale logistics warehouses, and these facilities are experiencing significant changes in their structure and function. The trend is towards larger, multi-level structures with spacious interiors and high ceilings. In some warehouses, mezzanine structures with stacked racks are utilized, and the internal space is evolving to handle complex tasks such as sorting, packaging, and processing, in addition to storage. Furthermore, logistics systems are increasingly moving towards unmanned automation, leading to substantial changes in the overall architecture and disaster management environment compared to the past.

Considering these developmental trends in warehouse facilities, it raises questions about the effectiveness and appropriateness of current fire safety regulations. Logistics warehouses, with their extensive spaces and high electricity usage, are particularly vulnerable to fire hazards. This study aims to evaluate how current fire safety regulations align with the changing environment and characteristics of logistics warehouses and to propose necessary adjustments and standards.

Fire safety regulations for logistics warehouses are addressed under the Building Act, Fire Service Act, and Logistics Facility Act. The Building Act sets safety standards through the building's materials, shape, and structure, including requirements for emergency stairways, elevators, and fire zones. The Fire Service Act mandates the installation of firefighting equipment, alarm systems, and evacuation facilities in warehouse facilities and requires performance-based design for larger

establishments. The Logistics Facility Act calls for the preparation and maintenance of a fire safety management plan. However, the Enforcement Decree of the Building Act often excludes stacked racks from various safety facility installation requirements, though the trend is towards strengthening regulations for the installation of firefighting equipment such as sprinklers, as per the Fire Service Act.

Most of the fire safety building standards under the Building Act or Fire Service Act are specification-based, depending on the area and floors of a building, and haven't changed significantly from the standards applied to smaller, simpler warehouse facilities. Additionally, the current Building Act does not sufficiently consider the diverse purposes of warehouse facilities, categorizing them under a single use, and there is a lack of integration with performance-based design required by the Fire Service Act.

Investigations into the designs of large-scale logistics warehouses have uncovered several issues. Firstly, the installation of fire safety devices is based on fixed standards, but there's a lack of consideration for actual human behavior. Secondly, the high ceilings and complex structures inside warehouses might reduce the effectiveness of fire safety devices during a fire. Thirdly, the fire risk can vary depending on the purpose of the logistics warehouse, which is not adequately reflected in current regulations.

The interpretation and application of laws are becoming more stringent, yet this intensification often only tightens existing regulations, not necessarily advancing towards performance improvement. Contrarily, other countries invest more in research and development of performance-related technologies for fire safety, showing growth. Reflecting this international trend, setting an improvement direction for the fire safety building standards of logistics warehouses is crucial.

The main improvement suggestions based on discussions with relevant experts are as follows: Firstly, regulations need to be made more flexible and rationalized to accommodate the characteristics of large-scale logistics warehouses. This study proposes amending the Enforcement Decree of the Building Act to allow for relaxed regulations and alternative designs following architectural committee reviews for large-scale logistics warehouses. Additionally, amending the ordinance of the Ministry of Land, Infrastructure and Transport to rationalize the standards for firefighter access window heights is suggested. Secondly, as the internal complexity of warehouses increases, the standards for safety equipment should be strengthened.

Related to this, amendments to the Enforcement Decree of the Building Act are proposed for establishing regulations for warehouse ventilation windows and limitations on the installation area of stacked racks. Lastly, considering the various fire loads, differentiating the use of spaces and establishing appropriate fire safety standards is necessary. This study recognizes the need for fire safety standards in logistics warehouses to be applied differently based on the number of occupants and the fire load of stored goods, proposing a long-term perspective on subdividing warehouse facility uses and setting appropriate fire safety standards.

In conclusion, the fire safety regulations for logistics warehouses need to be flexibly amended to reflect the continuously changing and evolving reality. This would allow for the adoption of customized safety measures suitable for the diverse characteristics and environments of logistics warehouses, minimizing fire accidents and creating a safer logistics environment. This study has limitations in terms of experimental approaches to the fire hazard risk of different types of logistics warehouses and a lack of statistical and data-based specific standards. Therefore, future research focusing on an in-depth analysis of the use and fire risk of logistics warehouses and developing more sophisticated fire safety standards will be essential. Such research is expected to contribute to enhancing the safety and efficient operation of logistics warehouses.

Keywords :

Logistics warehouse, Fire safety, Building Standards, Fire Safety Regulations