

Leveraging IoT Technologies to Improve Fire and Emergency Preparedness in Buildings

Modern cities are typified by closely packed high-rise buildings for residential and commercial use. The key aim of such high-rise construction is to accommodate more occupants and maximise the use of limited land space. However, the sheer scale of these modern facilities, high occupation density and growing user demands also present specific challenges for fire safety, security and energy management. The importance of building emergency preparedness and the ability to safely and expediently evacuate large numbers of occupants from buildings in an emergency, is critical in today's smart cities.

The rise of smart Internet of Things (IoT) sensors, secured network connectivity, data analytics and artificial intelligence technologies provides facility managers and building owners with new solutions. These technology-enabled solutions help to address a range of evolving challenges, whether it is securing occupants' safety, optimising maintenance processes or ensuring energy-efficient and environmentally sustainable outcomes.

The increased number of occupants in high-rise buildings means that timely and efficient evacuation, aided by fire safety alarms and emergency lighting, is crucial in an emergency. Failure could lead to disastrous consequences. Therefore, government agencies have spelt out stringent requirements when it comes to fire safety equipment, including emergency signs and exit lightings. These must function properly when the electricity supply is cut, and all other lighting fails.

As is known, assurance testing of fire safety equipment makes up a significant part of building maintenance costs. To ensure that emergency and exit lights are in good working condition during an emergency, facility managers and building owners must allocate manpower to conduct functional testing. Besides the labour expense, maintaining accurate records of inspection procedures and carrying out regular audits could be costly and prone to human error.

The current challenges

The maintenance of emergency lights is a challenging task. Traditionally, emergency and exit lights are manually tested – workers have to perform physical checks on every emergency and exit light in the building and record findings as part of compliance. The procedure involves discharging and charging the battery packs, which is very time consuming and often overlooked. Lapses could result in defective batteries, which do not hold the required electrical energy to power emergency lights during an emergency.

Several cases reported recently have exposed this shortcoming, wherein emergency lights did not work during power outages due to the lack of proper checks and maintenance.

Hence, complying with mandated fire safety requirements is both labour-intensive and time-consuming, particularly in larger buildings where manual testing becomes expensive. Moreover, discharge tests may require the interruption of power supply, and this can affect business operations and the safety of building occupants.

A new paradigm of fire-safety in buildings

In view of the challenges, ST Engineering has developed the E-WATS Wireless Automatic Test System for Emergency Lights, a robust standards-compliant system which ensures the emergency preparedness of the building in times of fire or natural disasters. With the automated and self-testing functionality of the emergency lights, the IoT-enabled E-WATS solution offers distinct advantages of safety, functionality and operational efficiency.

By incorporating a wireless mesh network of sensors, building owners will have the ability to manage all emergency signs and lights on a single platform with precision and respond promptly to potential failures.

The future of fire safety and emergency management involves combining operational reliability and smart automatic testing that removes the need for onerous maintenance checks.

Fully automated and self-testing solution

E-WATS simplifies the testing process by replacing manual checks with regular automated testing and reporting. The system ensures both the operational status of emergency lights and compliance with fire safety regulations.

Each emergency lighting includes a built-in Automatic Test Unit (ATU) with self-diagnostic capabilities to detect battery failure, lamp failure and LED failure, ensuring compliance with safety standards. The fully automated and self-testing feature is capable of detecting the exact failure points for immediate rectification. With predictive analysis capabilities incorporated, pre-emptive maintenance action can take place even before the lights fail, ensuring building occupants' continual safety.

Customised testing in compliance with fire safety regulation

In compliance to fire safety regulations, the system is able to commission regular diagnostics and mandatory tests based on a monthly or yearly frequency, as needed. In addition, the system is able to conduct non-mandatory routine protocols that helps

to enhance the battery life and performance. These maintenance routines, such as discharge tests, can be customised and scheduled accordingly to the recommended checks and requirements of the manufacturer. Hence, building managers can be fully assured that testing of fire safety lighting system are done regularly and promptly without any disruption during operational hours.

A unified platform for remote control and monitoring

The centralised software display allows the control and monitoring of emergency lights from a single platform. From a unified dashboard, building managers will have a clear and complete visibility of the operational status of all emergency lighting performance data and operational information. The collective data allows monitoring of the battery health, LED failure, and lamp status of the emergency lighting systems in all managed properties and facilities to provide a for complete operational status picture. Diagnostic tests can be also be scheduled to ensure continual operations and accelerated response to lights failure. Besides saving manpower on physical and visual checks, it also eliminates the risk of human negligence and frees the maintenance team from cumbersome paperwork.

Future-proof smart infrastructure for environmental monitoring and building management

The utilisation of a time division multiplexed based wireless mesh network using licence-free frequency bands enables several hundreds and thousands of units of emergency lightings and signs to be connected seamlessly. This brings forth an added advantage when considering the future expansion of a building, as there is no need for costly additional network infrastructures such as access points, Wi-Fi and SIM cards. In addition, E-WATS can be integrated with applications like security, utility and other smart detection sensors for comprehensive fire safety, environmental monitoring and energy management. This feature allows building management to plan for fire safety measures at the expansion areas with a peace of mind, and provides a future-proof platform for future intelligent building management applications.

IoT-enabled, assured emergency lighting system is advantageous in modern buildings, providing safety and security while reducing costs at the same time. With the need to improve the emergency preparedness of high-density buildings, a system that offers both safety and efficiency is a fundamental aspect of fire and emergency management in a building.

E-WATS brings forth a smart, automatic and infrastructure-free emergency lighting system which makes it convenient for building owners to maintain all emergency lighting in tip-top condition – while lowering costs, saving manpower and ensuring

compliance with fire safety regulations.

Shaping the future of fire safety and emergency preparedness in buildings with E-WATS.

Find out how you can improve fire safety of your building with smart IoT technology. Contact us at info@agillites.com for more information.