

## IoT Can Help Save Lives

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Internet of Things (IoT), Grenfell Tower, Smart Detectors, Fire Detection, Mass Notification System, Fire Alarm Panel, Safety

### Overview

Accidents like the Grenfell Tower fire, keep happening across the globe. It is unfortunate that, in 2017, when we are at the cusp of a digital and industrial revolution, we have failed to effectively use the technology at our disposal. Accidents like these, compel us to review and improve not only the existing technology and its implementation; but also associated regulations, policies, and enforcement.

The fire at Grenfell Tower in London last summer resulted in scores of deaths and shocked us all. It made many of us wonder why, even with all the progress made in terms of technology and regulations, such large-scale incidents continue to occur.

While investigation is still under way to determine the exact cause of the incident and the reason why the fire spread so quickly, early reports highlighted some of the major issues.

Media reports suggest that the Grenfell Tower did not have a functioning central fire alarm system. Furthermore, not all smoke alarms in individual flats worked properly. Most residents claimed that they were alerted about the fire only when they heard people screaming for help or knocking on their doors. Experts expect that the building's new exterior cladding will be determined to be the main factor that caused the fire to spread so rapidly. Based on established policy, the first responders instructed residents to "stay put" unless their own flats are on fire. This policy, frequently used in compartmentalized, high-rise buildings such as this, assumes that most fires in these buildings can be contained within the flat for at least 60 minutes, before the fire fighters arrive. The policy, and the subsequent delay in changing the instructions when it became apparent that the fire was spreading faster than firefighters could contain it, appears to be the major cause for the high casualty count.



These early reports have raised several questions. Were the detectors in the building properly installed? Were safety inspections conducted regularly? Was the central alarm system properly maintained? Was the new cladding properly tested? Why were so many people unable to leave the building? Why were the instructions to “stay put” not changed sooner?

This accident highlights how we have failed to use the available technology to prevent a small fire from turning into such large-scale catastrophe. It has compelled us to review and improve not only the existing technology and its implementation; but also associated regulations, policies, and enforcement.

### IoT Can Help

Fire safety is among the various areas that can benefit from Internet of Things (IoT) technology. The IoT has helped create a smarter and more connected world. We have various kinds of fire detectors and suppression



**Nest Protect Smoke Detector and App**  
(Source: Nest Labs)

systems to provide appropriate alerts and/or prevent fires from spreading. Thanks to IoT-based technologies, these products are becoming more intelligent and connected. With IoT, centralized systems can now send safety alerts to hundreds of people quickly and effectively. Several leading fire safety companies have also developed IoT-enabled fire detectors that are appropriate for single-family homes or smaller multi-family dwellings.

The most popular connected smoke detector on market is offered by [Nest Labs](#), a leading supplier of smart home automation products. The company, now a part of Alphabet Inc., offers the Nest Protect smoke and carbon monoxide detector. The Nest Protect detectors can communicate with the Nest thermostat and can alarm residents if they detect fire or carbon monoxide. The detectors can be accessed remotely from anywhere using mobile apps. In the event of an alarm, the detectors sound a local alarm as well as send notifications on the mobile phone.



**Roost Connected 9V Battery for Smoke and CO Detectors (Source: Roost, Inc.)**

[Kidde Systems](#), a leading safety product company, offers a monitor to add connectivity to existing detectors. With Kidde's RemoteLync Monitor, users don't have to change all detectors. The monitor listens for the specific frequency of smoke and CO detectors and sends an alert to its app when it hears them. One single monitor can cover multiple detectors on the floor.

Another retrofit option for users is available through a company called [Roost](#). The company offers a connected, nine-volt battery that contains a Wi-Fi antenna and a micro-

phone. Users can swap their regular batteries with Roost batteries in their old detectors to add smart features. The battery can send a push alert whenever the detector sounds. Users can also check the remaining battery life at any time with its app. Various other smart detectors and connectivity products are available through large players such as [First Alert](#) and new startups such as [Leeo](#).

### Slow Adoption of Advanced Solutions

Clearly, plenty of technology innovation is going on to help avoid tragedies such as the Grenfell fire and we continue to hear about new and upcoming smart products. So when we have such advanced detectors available, why aren't we using them? One reason is that while many high-

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Moreover, the regulations do not mandate them. Against this background, it's likely that it will take some time before these smart detectors will be used in most houses and buildings.

end IoT-enabled safety solutions are available in the market, they are not cheap. Many smart detectors cost three to four times more than traditional detectors and current regulations do not require them. Against this background, it's likely that it will take some time before these smart detectors will be used in most houses and buildings.

### Central Fire Alarms Could Enhance Safety

While the smart detectors discussed above are more suited for single-family homes or smaller multi-family dwellings, larger residential developments

(such as the Grenfell Tower), should be equipped with functioning central fire alarm and voice evacuation systems.

In a central alarm system, all detectors are connected to a central controller and send signals directly to this controller. The controller actively monitors multiple locations and, when it receives alarm input from the detection devices, the controller activates notification devices such as horns, strobe lights, and speakers to alert the occupants.

Now, more and more connected and smart features are also becoming incorporated into central alarm and evacuation systems. Today's latest mass-notification systems include a paging component to relay live audio instructions throughout the building in case of an emergency. Many also include support for various types of emergency messages such as inclement weather, security alerts, "Amber" alerts for missing children, etc. Advanced features in mass notification systems include the capability to communicate alerts via SMS, text, e-mail, popup, app message and push notification to targeted recipients, thus helping create quick and effective awareness.

It's likely that these types of centralized advanced notification systems could have helped save many lives at the Grenfell Tower where many residents did not receive the alerts in time to get to safety.

### **Analytics Could Help Improve Planning and Response**

Consumer and industrial IoT-enabled technologies could also improve emergency planning. Sensor and detector data and other surveillance data could be combined with algorithms and analytics to help improve emergency or evacuation plans. Analytics could consider multiple factors such as the number of people in the building; individual building maps; location of fire; fire spread rates for different building materials and construction techniques; and likely direction of fire and smoke. Using the available data and analytics, these plans could be designed to prevent congestion and speed evacuation, by guiding residents in different parts of the building to take the optimum routes.

During a fire emergency, first responders could also use real-time data and analytics to battle the fire more effectively and provide the correct guidance to occupants to help prevent panic and avoid injuries or deaths. In the case of Grenfell Tower fire, for example, such analytics could have helped safety

officials realize that pace at which fire was spreading was faster than the pace at which it was being controlled. Knowing this, they could have revised the “stay put” instructions sooner and use the sensor data to guide tower residents to open and accessible exits.

## Recommendations

Even with the best of technologies, we cannot avoid safety incidents altogether, but much could be done to prevent minor incidents from developing into catastrophes such as at the Grenfell Tower. Connected products and solutions such as smart detectors, alarms, and notification systems could help us gather crucial alerts quickly and better plan for emergency situations. Users should evaluate and implement these connected technologies to enhance safety, minimize damage and save human lives.

Although safety technology has come a long way, technology alone is not sufficient and probably never will be. Often, disasters happen not because of faulty equipment or lack of appropriate technology, but from lack of proper implementation, poor planning, or – in industry – due to a poor safety culture. Deploying advanced safety technology will not help improve safety unless the technology is properly implemented and maintained. Appropriate regulations, policies and procedures should be in place and adhered to rigidly.

Governments all over the world should implement strict regulations and make sure these regulations are enforced. They should continue to carefully evaluate these regulations and available technologies and, update regulations as necessary. Governments and industrial organizations should also partner with technology suppliers and research institutions and promote research in advanced IoT safety technologies.

The Grenfell fire, along with many other incidents, have drawn attention to several factors that likely lead to catastrophic events. We should learn from these mistakes and work together to take the necessary steps to help minimize the frequency and severity of any future incidents.

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