**White Paper :
Fire Control Panel
Ergonomics**

// Tyco Fire Protection Products is a leading manufacturer of fire detection, suppression and protection solutions. Here, it examines how to ensure effective use of fire detector control panel technology through improved ergonomic design.

Ergonomics puts people at the heart of design to optimise comfort, functionality and user-friendliness. It encourages product developers and manufacturers to take into account how users interact with products, focusing on the strengths and abilities of people rather than setting a fixed design and forcing users to adapt. These parameters cover a wide range of factors, including age, size, strength, cognitive function, and most importantly in the case of technology-based products, prior experience.

Applying good ergonomic practice to products, such as fire control panels, strips out complexity from the user experience, making the systems easier, safer and more efficient to use. Combining an ergonomic user interface with an enhanced operating system and software capability makes this technology more accessible to a wider user base, which in turn meets the changing needs of system designers, integrators and end users.

The functions and components of a fire detection system

The purpose of a fire detection system is to save lives and protect critical assets and property. Effective fire detection requires the careful design and selection of robust and reliable components within the overall system to ensure identification and alarm in the event of a fire, while reducing the risk of errors and false alarms which can cause unnecessary evacuations.

At the centre of the fire detection system is the control panel. This integrates the functions and status of all system components, including various types of devices such as detector modules, call points, beacons and sounders, with other ancillary systems such as protection, plant and extinguishing equipment and alarm routing. A key component of the control panel is the user interface, where trained personnel operate the various functions of the panel and respond to alarm notifications. As fire detection technology adapts and changes to keep pace with industry regulations and innovations in both software and hardware, there is the opportunity to benefit from

a reengineered approach to panel usability.

Recent trends in building design have focused on discreet aesthetics to ensure fire system technology remains relatively hidden from view. Attention had previously focused on the panel enclosure design, ensuring this could be integrated into the interior design of the building without being too noticeable to visitors and the general public. Over the years this has resulted in a comparative lack of change in user interface design and functionality, which has led to confusion for system operators responsible for the fire detection system. As technological innovations in other markets, such as the security industry, have addressed the need to update user interfaces to improve user experience and make it easier for the operator, the fire industry can now benefit from technology advances to deliver the next generation in control panel equipment with enhanced user interface capability.

Focusing on user experience

Understanding how different system users interact with a fire control panel is key to considering the appropriate technology based on the system components and level of seriousness in terms of the fire risk. User interface ergonomics plays a key role in ensuring ease of use and relieving the common pain points associated with operating fire alarm control panels.

To further understand the challenges affecting different users, Tyco categorised typical operators of a control panel based on the frequency in which they interacted with the system, and the type of function they are likely to perform. Each of these groups tends to require a different level of understanding and access in order to operate the control panel confidently.

Occasional users include receptionist/facilitiesemployee and facilities manager. This group are likely to have less experience of working with the fire control panel and in this instance common 'fear factors' can become prevalent – flashing LEDs, unexpected alarm buzzers and system faults all create the potential to confuse the user. Medium to high frequency operators are typically system integrators, installers and maintenance engineers. These users posses a much more detailed technical understanding of the fire control system and can navigate to

various functions quickly and easily. Applying the following insight relating to each user group's particular pain points influences research and development into new product design and engineering in a way that supports improved user experience for all operators.

Receptionist

A building receptionist is often located near to the panel and as a first responder, requires a general level of understanding with regards to the system functions, such as silencing the buzzer, system fault notification and awareness of LED warnings and their relevant meanings. Recognising and understanding the phases of the fire detection system along with a basic level of access ensures the ability to interrogate and assess the information, as well as identifying potential false alarms and system errors. For example, if the operator is aware that maintenance and hot work is being carried out in an area of the building and the system triggers an alarm in that zone, then the individual can take steps to verify the warning and take appropriate action.

Facilities manager

The building management team will typically perform a regular fire test and have operational responsibility for the fire detection system and any related fire safety procedures such as evacuation plans. Therefore login functionality is essential to manage more features of

the system, including fire drills and disabling certain components. This is particularly useful as it is based on the facility manager's knowledge and experience of the system. For example if kitchen equipment, such as a toaster, is located in one part of a building and heavily used between certain hours of the day which then triggers the fire alarm, then components in that zone can be configured to reduce the potential for false alarms.

System integrators and installers/maintenance engineers

This user group is often responsible for connecting and interrogating devices within the system, either during initial installation or routine maintenance. Flexibility, system integration and ease of use are critical factors for these individuals as a complex and convoluted user interface impacts on the speed of installation and commissioning. The ability to access complete system functionality speedily and easily is valuable as operations are often repeated many times during a single engineer visit. Insert table which summarises the requirements of different users and the solutions.

User Requirements

Frequent User	Moderate User	Infrequent User
Typically connect and interrogate systems regularly, at installation or during maintenance. Generally require a system that can be operated with speed, ease and flexibility incorporating sufficient system integration options and customisation. Will access functions multiple times over and want to do this quickly without repeating selections or retracing steps. Do not want a complex and convoluted user interface which impacts on the speed of installation and commissioning.	Typically perform regular tests and have some operational knowledge. Need to quickly identify which area or location is involved in the alarm event, and be able to act on that place quickly. Require easy login functionality to manage more features of the system, such as fire drills and disabling components or ad hoc areas. Want a system that is cost-predictable and will deliver across the entire lifetime without any surprises.	Is typically the first responder and needs to act quickly with no physical or psychological barriers. With possibly no operational experience, the user may be afraid of making mistakes, which is worsened if the panel is complicated, complex or confusing. Complex menus lead to confusion. Confusion = fear = paralysis because there is no guidance, or the panel is not intuitive. Consequences: what happens if I press the wrong button? Common fear factors include coping with and being confused by: - flashing LEDs & their meanings - unexpected alarm buzzers that need silencing - system faults First time users could actually be interacting with the panel during a real life emergency! Time wasted = greater risk.

PROFILE Touch Screen User Functionality

Frequent User	Moderate User	Infrequent User
The software can be customised by the engineer and will provide cause and effect data. New Context Sensitivity touch sensitive LEDs provide system output status in one click. This also relays detailed status information and encourages a fast response to events. Enhanced USB configuration is available to download status info in reports and save time on installation and service. The panel has one logical interface to access faults/archive and a 10,000 event log available. There are three easy to read colours to indicate faults/status. Keys not required, login via RFID switch, user ID and passwords provided. This also enables identification of users and traceability of actions.	Context-driven user interface based on logical locations within the building. The panel provides a floor plan of the zone in alarm. Simplified functions, alarms and controls on same screen for speed. No more need to consult multiple screens or menus. Complexity is stripped out, less risk of input errors. User experience is faster. The home screen is fully customisable and can include a company logo, it presents the entire system configuration in a clear and logical way helping to save valuable time. Three easy to read colours to indicate faults/status. Keys not required, user ID and passwords provided. This also enables identification of users and traceability of actions.	The Home Screen has an easy to read appearance with big, plain text and precise info at the press of a button. It also has an easy to use Info Button and context sensitive help functions with an egonomic icon display and multilingual interface. The integrated menu structure helps to simplify common functions and makes the controls intuitive and on the same screen as the error/alarm. This reduces the risk of input errors and helps combat fear and paralysis during an emergency. Has three easy to read colours to indicate faults/status to help recognition at a glance and promote quick action.

Common problems with fire systems

Exploring the common problems affecting system operators has enabled fire detection suppliers to develop technology which overcomes these issues. For many users, concerns relating to making mistakes because the user interface is too confusing and complex is a major issue. The first time many operators may interact with the control panel could potentially be in an emergency, and the more complex the user interface, particularly for the building management and first response emergency services, then the greater the risk for costly mistakes, wasted time and potential business and operational disruption.

Complex menu systems can easily lead to confusion. This then has the effect of paralysing the user through fear of selecting the wrong function, or pushing the incorrect button, particularly when no guidance is provided, or the system is not intuitive to use. Undermining users' confidence in how to operate the system through complex and convoluted procedures creates an unnecessary cycle of confusion and stress which ultimately works against the need for rapid and calm reaction in times of an emergency.

One typical, but often crucial, concern relates to the consequences if a user pushes the wrong button. This becomes even more apparent when system operators often equate additional and enhanced functionality with a more complex interface, which could potentially only add to their worry.

The pace of technological advances and innovations in fire detection often moves quicker than the developments in regulations and legislation which drives the performance parameters for such systems. The typical lifespan for fire control panels is 10 years plus and technology has often moved ahead several times during this period. Achieving the necessary certification and approvals can also be a complex process, although this is a critical step in ensuring proven and robust technology and providing end users with peace of mind. As a leading manufacturer of fire detection technology, Tyco Fire Protection Products invests in complying with all recognised approvals to the highest industry standards and often goes above the requirements of regulations such as those mandated by the Construction Products Regulation, to address the needs of end users.

How can technology innovations overcome these issues?

Many existing fire panels require extensive technical and operational knowledge, such as understanding which location within a building applied to a specific zone, loop and component. This made identifying the location of a system alarm or fault complex and time consuming, while a complicated user interface prevented all but the most experienced of users from operating the system.

Observing how operators interact with fire alarm systems and listening to their concerns can help to identify specific issues and focus the development of a solution on mitigating these problems. To overcome the pain points highlighted by Tyco's user analysis required a rethink in terms of the way fire control panels are designed and engineered.

This new philosophy places a context-driven user interface at the core of the system based on logical locations within the building, rather than the system. Using context-driven functionality, an integrated menu structure simplifies common functions, such as isolation and reporting, putting the controls the user needs where they expect them to be at the time they need them. For example, if a system component is in alarm, users can navigate to controls within the same

notification screen, rather than needing to take a note of the zone, loop and ID number before consulting a separate menu. In taking this new approach, Tyco has stripped out complexity to provide easier administration of the control panel, reducing the risk of input errors and making the user experience faster and more intuitive.

The PROFILE solution for improved usability

As part of its ZETTLER fire detection technology, Tyco has developed its PROFILE range of detection and alarm systems. Featuring a next generation touch screen user interface, the PROFILE system combines robust and proven MZX Technology that is highly resilient to external factors and sources of false alarm. Designed to provide a powerful fire detection solution, PROFILE panels feature innovative functionality such as touch sensitive LEDs which relay detailed status information and encourage a fast response to all system events.

Advanced usability is a core function of the PROFILE panel range, meeting key user requirements for intuitive and easy-to-operate systems. Intelligent user guidance replaces the complex and confusing processes featured in typical control panels and a multilingual interface, ergonomic icon display provides system status updates in one click. The Info-Button feature provides intuitive navigation

for operations and includes a context sensitive help function for enhanced ease of use.

Reliable system alarm

Fire control panels are governed by EN54 with regards to the output device status information and way it is presented to the user. A common problem faced during an alarm is the difficulty in navigating to further information to help the system operator understand the location of the alarm. The PROFILE range of control panels not only fully complies with the requirements of EN54, but also mitigates the challenge of identifying specific components by presenting the user with a floor plan of the zone in alarm. This saves valuable time during an alarm event and enables users to act quickly and decisively.

Fast LED access

The PROFILE range provides quick access to output device status information and system performance via the relevant LED on the control panel. This gives the user access to a clear update relating to the system, relevant fault/active status and ability to control the function of the devices all from one logical interface.

Easily identifiable colour scheme

Traditional fire control panels display text and system updates in a single colour, which can make it more difficult for system operators to navigate the system

and clearly identify changes to the status. ZETTLER PROFILE summarises system information in three separate colours – yellow, red and blue to indicate fault/isolated/test status, fire status and quiescent status respectively. This enables users to avoid unnecessary confusion and identify at a glance and from a distance the current system state.

Enhanced USB configuration

ZETTLER PROFILE panels combine intuitive user interface and navigation with enhanced USB configuration. This enables system operators to download vital status information such as disablement/active status and point information in clear, formatted reports. Built in security features also prevent misuse of this information by requiring user ID and password to access the system via USB.

Unique RFID capability

Fire alarm panels typically require a key to access the system and operate functions such as day/night mode. This often presents practical issues as keys can be accidentally left in the panel, lost or damaged. PROFILE panels overcome this by offering a dual-compatible software login featuring a two-digit user ID and six-digit numerical password for enhanced security. This is further improved by a unique RFID login which enables unique user programming for specific access and user simplicity.

Clear, named navigation

Traditional fire control systems typically require users to know the exact location and connection of the devices within a specific zone. In addition to a complex and confusing user interface, this presents further problems to operators and makes the overall operation of the fire detection system more difficult. PROFILE panels are designed and engineered to learn the entire configuration and present the system points to the user in a clear and logical way. This information is then available to the operator using a number of filters in order to easily select the specific points within the system.

Advanced, integrated technology for improved usability

ZETTLER PROFILE panels represent the next generation in advanced, effective and compliant fire control panel technology. Removing the common pain points for system users helps to minimise the potential for false alarm events and system errors and ensures that intuitive usability is at the heart of the system. Developed using technology originally designed for the most hostile environments, system integrators and end users can be confident in the resilient and robust platform which supports the proven performance of the PROFILE system. Suitable for a wide range of applications in the commercial, retail and public sector industries, ZETTLER PROFILE is the next step in fire detection solutions.

Ergonomics play a vital role in many products we use every day.

In bringing these practices and principles into the fire detection market, we identified an opportunity to take a fresh look at how users interact with control panels and develop a new system based on innovative technology that overcomes the common challenges users face. Applying the learnings from our user analysis workshop offered valuable insight into the different characteristics of each user group, which then informed

our research and development process to underpin the creation of the PROFILE system. Combining effective and resilient technology with a reengineered user interface provides operators with peace of mind and enhanced usability to remove any obstacles or challenges in using the system.

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