

Building sustainability under fire

by Peter Parsons, Chair of ISO/TC 21, Equipment for fire protection and fire fighting and Chair of ISO/TC 21/SC 3, Fire detection and fire alarm systems.

Safety from the effects of fire is crucial to a building's sustainability – both from the perspective of the occupants and of the building structure. Subcommittees of ISO technical committee ISO/TC 21 develop standards for equipment and systems used to detect, limit the spread and suppress fire and smoke in a building. In the event that a fire does occur, a range of different interacting fire and smoke management systems are used to provide an internal environment that can remain tenable while the occupants evacuate the building. At the same time, suppression and containment systems act to limit damage to the building, adjacent buildings and the environment.

Early detection and response

Early detection and intervention are important to limit the spread of fire and the noxious gases that often occur as a product of combustion. Insidious killers, like carbon monoxide gas, can overcome a person well before there is a risk of burn injuries from a fire. Other gases and thick smoke may impair a person's vision, disorienting them and preventing their timely evacuation from a burning building.

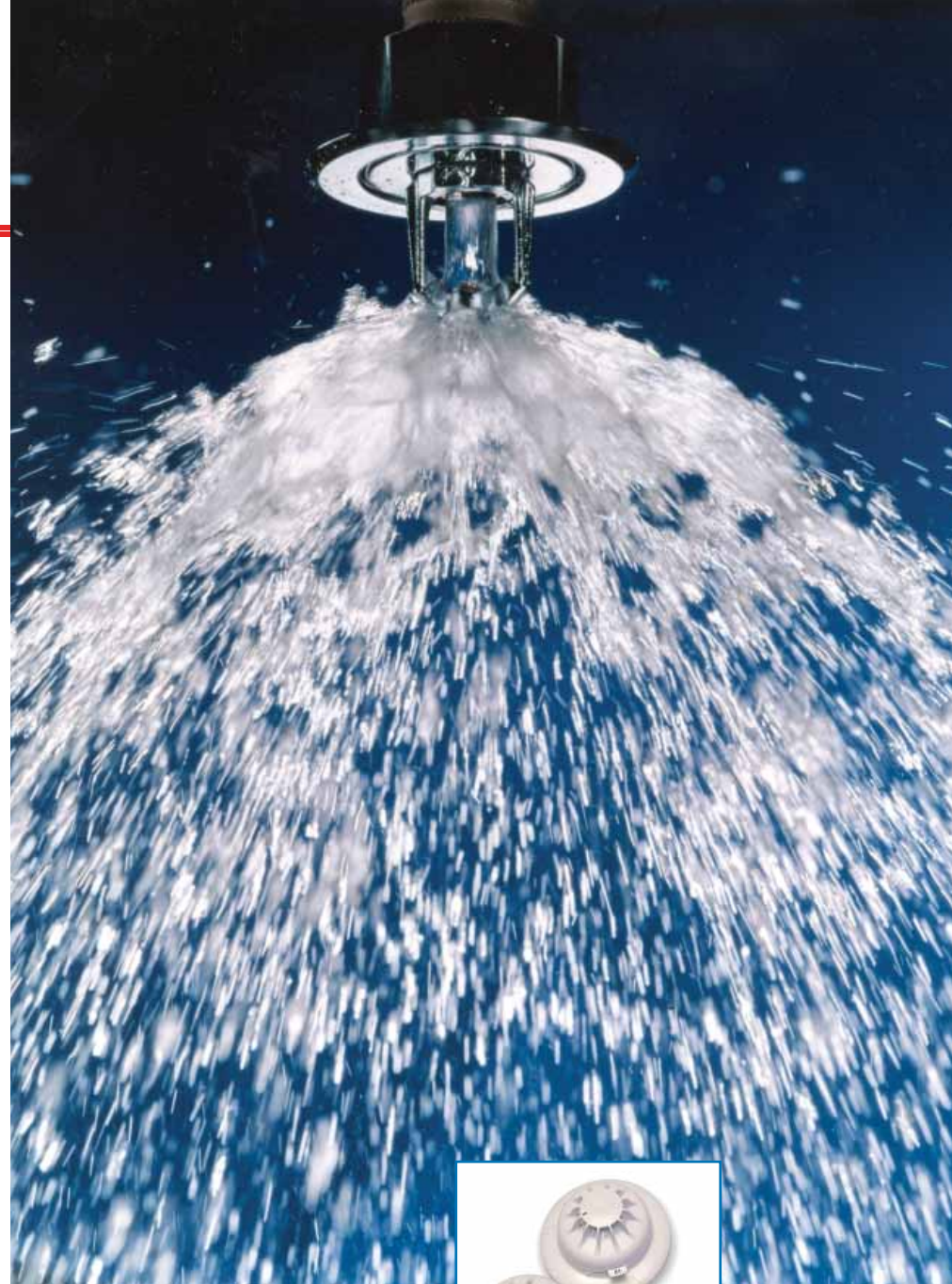
Smoke detectors are a critical life safety system for building occupants. Early warning smoke detectors, placed on ceilings, ducts and other concealed



Sprinkler head. © TC 21



Extinguishing a fire. © TC 21



Sprinkler operating (top) and fire detectors. © TC 21

spaces, are often the first devices to detect a fire. As soon as a fire is detected, a whole series of pre-programmed inter-related tasks may be initiated.

A sound system may be used to alert trained staff of a hazardous situation. The staff may direct the building's occupants to safe exits as the sound system initiates a pre-programmed evacuation sequence. A monitoring service may be alerted, which may then initiate a response from the fire service. The design, planning and practice drills help ensure the building is evacuated in a safe, orderly and expeditious manner.

Audible and visual signals are used to advise occupants when to leave their area. A standard signal is specified in ISO 8201¹⁾, which unambiguously means "evacuate now". Unfortunately, despite all good efforts, this signal has not received universal acceptance. With an increasingly mobile global population, this remains an issue for regulators to resolve.

1) ISO 8201, *Acoustics – audible emergency evacuation signal*

2) ISO/DIS 21927, *Smoke and heat control systems parts 1-3*

Smoke and heat management

Heat and smoke management systems are used to limit the spread of a fire and the resulting smoke. These management systems assist with building evacuation and fire containment, while maintaining a tenable building environment long enough to allow safe evacuation. The design requirement is to ensure the risks do not rise to an unacceptable level within a prescribed time.

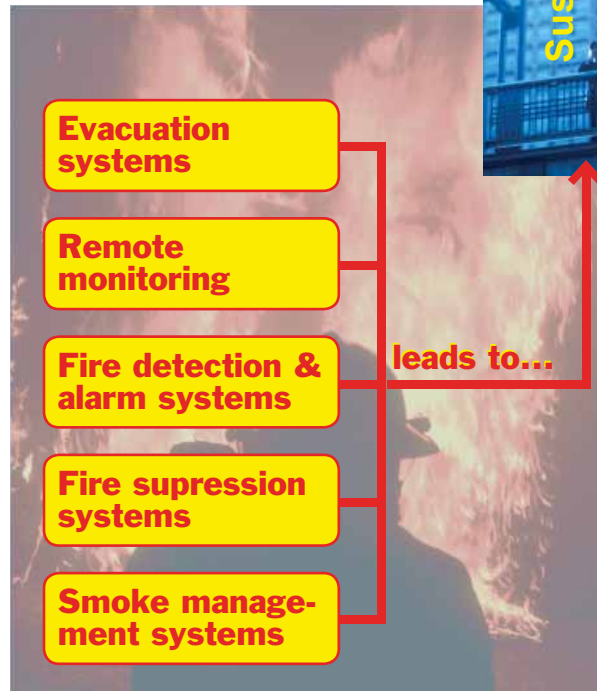
Perhaps as part of the general building air conditioning systems or as dedicated units, fans are used to exhaust areas of the building where smoke density increases the risk of safe evacuation. Other fans will be shut down to prevent the spread of smoke into other areas of the building not otherwise affected by the fire. Fire isolated exit stairs and passageways will be pressurized to prevent smoke from the fire entering this safe egress path. Even in adjacent buildings, smoke detectors monitor the quality of air being drawn into the building. If smoke from a fire in another building is detected, the smoke management system will shut down to prevent occupants of other buildings being affected. ISO/TC 21/SC 11, *Smoke and heat control systems and components*, is currently preparing a suite of standards, ISO/DIS 21927²⁾, that address this area of building safety.

About the author



Peter Parsons (pparsons@tycoint.com) was appointed the Chair of ISO/TC 21, *Equipment for fire protection and fire fighting* in 2005. At the same time, he

has been a delegate to ISO/TC 21/SC 3, *Fire detection and fire alarm systems*, since 1997 and its Chair since 2001. He is also the Convenor of a number of SC 3 working groups. He has been a member of the equivalent Australian standards committee since 1989 and its Chair since 1995.



imum performance requirements of the relevant standard. Independent third-party assessment is most commonly used and agencies around the world maintain a list of products that continue to meet requirements of the standards.

Developing countries are more vulnerable

Protecting occupants and buildings from the deadly effects of fire underpins the standards developed by our committee. Their applica-

Fire suppression

Small fires may be extinguished using portable fire extinguishers by building occupants. In cases where a larger fire develops, a fixed sprinkler system may be activated by the heat from the fire. The sprinkler heads, which can be seen protruding down through the ceiling of a building, activate at a pre-determined temperature and water is used to quell the fire. In special applications, such as petrochemical plants or to protect valuable assets (i.e. computer rooms), foam, powder and gaseous extinguishing agents may be used.

tion by regulators, however, differs between developed and developing countries.

For developed countries, ISO/TC 21 standards provide a set of best practices that can replace or operate in conjunction with existing national standards. Thanks to their mature regulatory regimes, regulators in developed countries require the mandatory installation of fire safety systems.

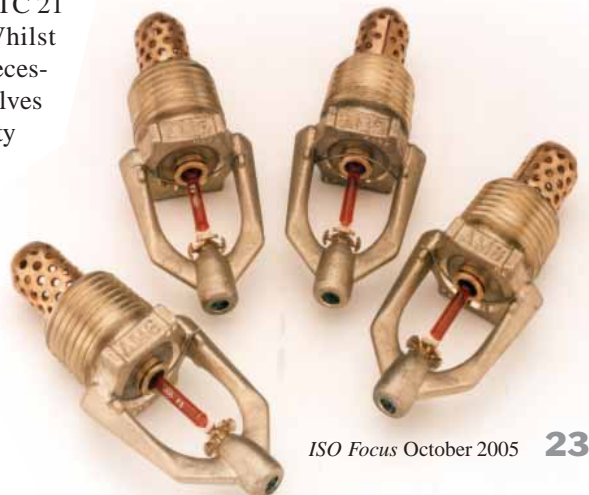


Fire control and indicating equipment. © TC 21

Compliance regime

The equipment and systems helping to sustain a building that is on fire are work items of ISO/TC 21 and its subcommittees. Whilst equipment standards are necessary, they are not of themselves sufficient. A strong conformity assessment scheme needs to be in place so as to give confidence to designers, building owners, regulatory authorities and building occupants that the equipment and systems meet the mini-

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For developing countries and emerging economies, like China and India, ISO/TC 21 standards provide a suite of standards to assist regulators and developers to adopt minimum equipment and system performance requirements. The use of the standards affords an improved level of safety to building occupants and building sustainability – particularly as developing countries are more vulnerable to fire due to their poor regulation and enforcement.



Fire detection and alarm system equipment.

© TC 21

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China is already showing its commitment to ISO fire detection standards. The National Supervision and Test Center for Fire Electronic Product Quality in Shenyang, China, has received its accreditation certificate from the China National Accreditation Board for Laboratories to assess fire detection equipment for compliance with ISO 7240. CNAL is the peak body in China for laboratory assessment. As a member of the International Laboratory Accreditation Cooperation, the CNAL accreditation now enables manufacturers from around the world to obtain internationally acceptable attestation reports for ISO fire detection and alarm system equipment. ■