

Post-Grenfell realisations about compartmentation for fire safety

The after effects of the tragic fire at Grenfell Tower have kick started a realisation that change is necessary in the fire industry. Too often in our industry it feels like the certification is driving the maintenance, with its insurance consequence for the asset owner and service revenue for the contractor, rather than maintenance (for safety sake) driving its consequential certification.



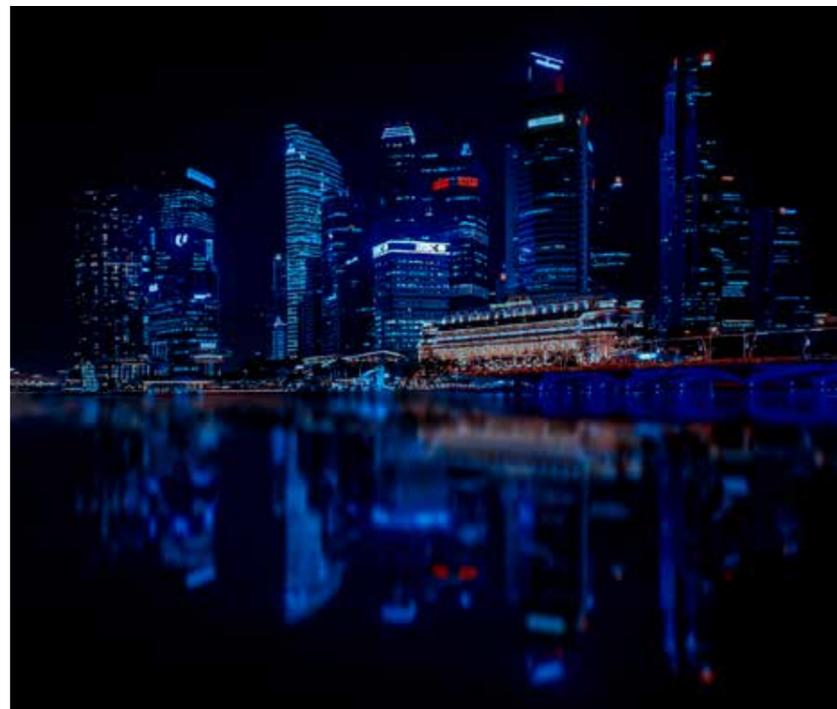
Carl Stephen Patrick Hunter

Minimal compliance with regulations is just not enough, and that the need to go above and beyond the standards exists for safety critical environments and high value assets. Action must be taken and people must be kept safe from the danger of fire. The regulations and the attitude towards them must change. The technology exists to go above and beyond them.

Would you enter a building if you were told as you stepped in that in the event of a fire there was a chance that the extinguishing system wouldn't put it out because the fire couldn't be contained?

▼ **With modern buildings, modern maintenance is expected – these buildings must have integrity at all times.**

No! People expect, and rightfully so, that in the event of a fire the extinguishing systems would be in full working order to do just that – extinguish. Given that the gaseous systems are designed specifically to the individual need of that room, building e.t.c, then a leak sites in the room could mean that the compartmented area couldn't withhold the fire. The likelihood of the gaseous system effectively extinguishing the fire gets lower and lower as the protected area becomes larger than the size that the extinguishing system was designed for. This is not a game of chance. The lives of people depend upon it. Enough is enough. The technology exists right now to support Door Fan Testing in providing a holistic and thorough integrity test of critical infrastructure.



Carl Stephen Patrick Hunter is CEO Coltraco Ultrasonics, and was awarded an Honorary Doctor of Science from Durham University for his contribution to Physics, commitment to innovation in research and professional development for the students who work with Coltraco.

► **Correctly sealed compartment as tested by Portascanner® from Coltraco® Ultrasonics.**

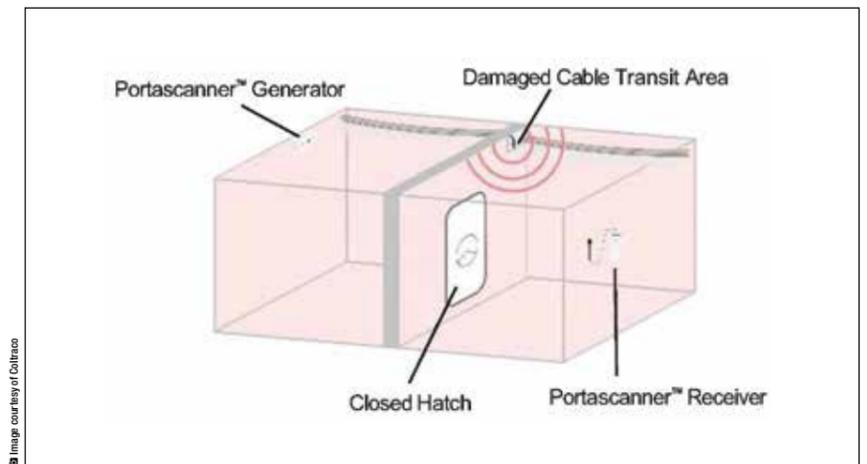
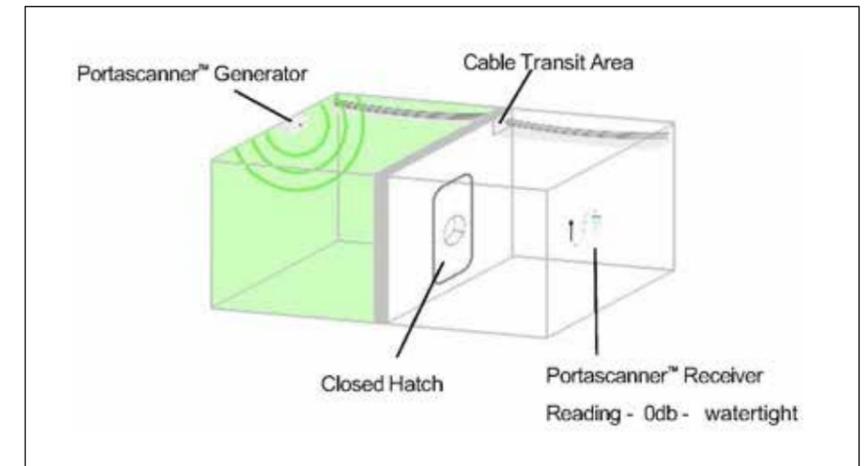
Compartmentation of protected spaces

In the event of fire, a pencil sized hole between compartments size 6m x 6m x 3m would take just 4 minutes before a person would not be able to see their hand due to smoke. If this compartment was a fire escape, there could be a severe threat to life if people cannot escape. Thus it is clear to see why the maintenance of the integrity of the compartments is essential to genuinely aid the safety to human life.

Compartmentation is used to prevent the spread of fire and smoke by subdividing buildings and providing adequate means of escape. Subdividing buildings into a number of compartments can restrict the spread of fire. One of the main concerns is to check that compartmentation is maintained, which often comes in the form of an audit on walls, floors, ceilings and their penetrations. There may be a requirement that in these walls there are seals, fire resisting ducts, fire resisting dampers, service ducts and shafts... There is a responsibility because of this to check penetrations for support, condition, the installation labels and that ducts/dampers are suitably fire stopped and supported and in good condition.

Regulatory requirements

The regulations demand that compartmentation is upheld for the safety of the individuals, who entrust their lives into its integrity. Approved document B, Fire Safety, Volume 2, Buildings other than dwelling house states that: 8.0 Every compartment wall should form a complete barrier to fire between the compartments they separate. 8.35 – any stairway or other shaft passing directly from one compartment to another should be enclosed in a protected shaft so as to delay or prevent the spread of fire between compartments. However, despite regulations best effort to promote the implementation of compartmentation and room integrity, the last review of the Building Regulations Approved Document B was made in 2006 (12 years ago) and its next review was not due to be completed until 2022 (which would then be a gap of 17 years), meaning that the attention that is deserved is often disregarded.



“Meeting minimum fire standards is not enough”

In response to the Grenfell Tower tragedy, Council Leader Cllr Stephen Cowan said “The fire in Kensington has made one thing clear – just meeting minimum fire standards is not enough. The regulations are clearly not good enough so we will be going above and beyond what is required.” Minimally complying with integrity testing is not enough. As building age or their internal use is changed leak sites develop and the threat to people becomes high.

To understand how fire resistant a compartment is, an inspection of the overall condition of the existing fire compartments is needed, as well as an assessment of the condition and effectiveness of the sealing of wall/soffit interfaces and an inspection of existing fire seals applied to service penetrations through fire compartment lines. Issues in the quality of compartmentation walls can come from maintenance, minor works and refurbishments. Contractors carrying out such tasks can occasionally destroy

▲ **Loss of seal integrity as Portascanner® from Coltraco® Ultrasonics shows the compartment has failed.**

the compartmentation integrity of the wall, floor or ceilings if they were unaware that the area is a comparted space (as shown in the below image). Therefore, following maintenance it is “good practice” to ensure the fire resistance of walls, floors and ceilings and to safeguard again if necessary. But what if this “good practice” is ignored, as it so frequently is, and there is a fire? The gaseous extinguishing system may not be able to control the fire and the fire risk spreading through the weakened compartmentation.

The technology exists right now to solve this problem

Coltraco Ultrasonics have provided a smart solution to quick and easy assurance of compartmentation using non-invasive ultrasound technology. The general setup consists of a portable ultrasonic generator placed in the inside



Images courtesy of Coltraco

▲ The importance and difficulties of compartmentation in buildings calls for more research and development.

of the compartment and the handheld receiver that is held outside to detect signal leaking through any apertures within the barriers. The Portascanner® 520 is a prime example of a leading product that uses such setups to not only pinpoint precise leak locations, but to determine their leak apertures as small as 0.06mm with a tolerance of +/-0.02mm. It is by far the most mathematically proven accurate device for this function.

The Portascanner® 520 provides interpretation of a room's airtightness by giving an indication of the location and extent of leak sites in the room. Understanding airtightness has direct

implications to compartmentation which plays a major role to improve fire resistance of the desired locations. The advantages of being able to accurately detect the exact leak locations and size are self-evident when considered alongside the resistance to collapse and transfer of excessive heat. In a case where there is too much leakage in a room, the Portascanner® 520 is an unrivalled ideal for the rapid and accurate identification of these sites so that they can be sealed. It is lightweight, fast and easy to use, allowing leak site detection at an increased operational efficiency and speed to a degree that has never been seen thus far in the Fire Industry. This equipment can support every step of the traditionally used Door Fan Testing (DFT) for room integrity testing:

1. Pre DFT

Portascanner® 520 enables fire contractors to indicate location and extent of leak sites prior to a scheduled DFT session for remedial action to be taken to maximise the success rate of a DFT which gives early anticipation of suspected issues. Pre DFT inspection adds great value to the contractor's range of services as patching up leaks take time to set and may impede the operations of a DFT if remedial work is conducted on the DFT scheduled day itself.

2. During DFT

Portascanner® 520 pinpoints the location and extent of the leak sites while the DFT is being carried out. If the particular room/compartment fails the DFT, Portascanner® 520 ultrasound can replace traditional leak detection tests by giving more accurate and quantifiable results. This allows for remedial work to be conducted immediately.

3. Post DFT

24/7 ROOM INTEGRITY MONITORING: Taking a step further, room integrity monitoring can also be enabled using ultrasound to provide true 24/7 structural integrity status with relevance to leak sites. This monitoring system works by tracking the changes to the overall ultrasound leakage in the room as determined during Point 1 and 2 and therefore needs to be installed continuously from the start. By having ultrasound receivers mounted at different points outside the room, an idea of the general areas and the timings of when a leak site starts to develop can be obtained through observing an overall increase in the receiver readings. By linking the receivers to a local alarm panel or wireless communication system, the monitoring system can be programmed to actuate a remote alarm whenever a leak site starts developing.

In 2017 with the continuing developments in technology, there is an expectation that safety should be all encompassing. We cannot let this expectation continue to be a fantasy.

Coltraco Ultrasonics are very proud Safesite® and Safeship® company enhancing safety at critical infrastructure wherever they are.

➔ For more information, go to www.coltraco.co.uk

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