

CROSS at 20: Learning from the past, responding to the present, preparing for the future

In 2025, CROSS celebrated its 20th anniversary. Against this backdrop, CROSS-UK's Structural Safety and Fire Safety Expert Panels met to reflect on the past, present and future of the scheme.

Background

Founded by the Institution of Civil Engineers and the Institution of Structural Engineers and later joined by the Institution of Fire Engineers as a supporting organisation, the work of CROSS is grounded in the expertise of the members of its Expert Panels.

Its remit has expanded steadily over its lifespan and now covers the fire and structural safety of buildings, infrastructure and other structures.

CROSS is unique not simply because of the information it gathers, but the way it gathers it. The scheme employs an open, collaborative, no-blame approach that encourages professionals to share concerns, learn from real incidents, and ultimately improve competence across the built environment. Its evolution into an international programme with hubs in the UK, USA and Australasia underscores its global relevance.

An important milestone in 2025 was the award of the three-year contract to run the official national voluntary occurrence reporting system (VORS) for structural and fire safety introduced by the Building Safety Act 2022. This award reflects the UK government's trust in CROSS-UK and cements its position in the wider safety ecosystem.

Learning from the past

A continuous journey, not a destination

One of the strongest messages from the Expert Panels is that, by its very nature, the work of CROSS can never be complete. The built environment sector never stands still. New technologies, materials, and procurement models inevitably bring new risks. 'Generational amnesia' means that the shared experience and common knowledge of one generation does not automatically transfer to their successors.

This point is perhaps one of the reasons

why the same underlying causes of failure can be seen again and again, across the CROSS archive of safety reports; competence remains uneven across the industry, fundamental design principles are misunderstood or misapplied, modelling and analysis tools are relied on without sufficient verification or user understanding, and product test data is treated as definitive, even when those tests do not reflect real-world conditions.

CROSS has, however, also adapted to changes in its operating environment. The Grenfell Tower fire prompted a significant expansion into fire safety reporting.

The value of confidential reporting

Confidential reporting remains the core of CROSS's work. By providing a psychologically safe space for raising concerns, the scheme enables practitioners to raise issues they might not otherwise feel able to share. The meeting heard that there is currently an encouraging upward trend in reports submitted to CROSS indicating growing confidence in its work.

CROSS also contributes to a broader cultural shift in the built environment. Over time, confidential reporting helps normalise transparency, collaboration and continuous learning. It also reinforces the idea that raising concerns is a professional responsibility. The industry and the public benefit enormously from such openness.

CROSS's independence is central to its ability to deliver these benefits. It can raise issues early because it has credibility and is not hemmed in by political or commercial pressure. Its role in raising the alarm about reinforced autoclaved aerated concrete (RAAC), several years before it entered public consciousness, meant that key industry bodies were better prepared to respond when the crisis hit in 2023.

CROSS as an evidence base

The Expert Panels homed in on the value of CROSS reports as 'authentic data'. The material gathered represents real experiences, real incidents, near misses, and early signals that cannot be sourced from hypothetical models or laboratory tests alone. This makes CROSS uniquely valuable to regulators, policymakers and industry leaders. Originally developed to support the Standing Committee on Structural Safety (SCOSS), the CROSS evidence base now informs guidance, standards development and safety decision-making by government, regulators and industry bodies.

Responding to the present

The Grenfell 'shock' is driving improvement...

The Grenfell Tower fire of 2017 remains the most significant catalyst for change for safety in the UK built environment sector. Its reverberations continue to shape regulatory frameworks, professional practice and public expectations. The Building Safety Act regime is still bedding in, but Expert Panel members noted early signs of positive behavioural change.

Some clients, for example, are now willing to invest earlier in design development to avoid Gateway 2 delays, a shift that hopefully indicates a more mature understanding of risk and responsibility.

CROSS's contract to operate the VORS presents an opportunity to play a larger role in amplifying these changes. It cements CROSS's place within the built environment safety ecosystem, reflects institutional trust and provides the financial stability needed to grow the scheme's influence.

...but pressures old and new continue to affect decision-making

Despite this encouraging progress, the

two Expert Panels noted that a range of familiar pressures continue to undermine safety. These include longstanding features of the business environment including fee compression reducing the ability to bring in fire and structural specialists at an early enough stage to influence the design process, corner cutting due to client pressure for accelerated delivery, value engineering eroding design intent, and fragmented responsibilities weakening design assurance.

On top of all this, too often clients and contractors simply lack any interest in the whole-life performance of the buildings on which they are working.

In addition, new and emerging issues are also presenting formidable challenges. One example discussed further below is the trend towards deploying modern methods of construction (MMC) such as volumetric modular construction (VMC), that demand high levels of coordination, checking and verification that the industry too often struggles to meet.

Finally, the changing structure of the built environment sector is also shaping competence. For example, the long-term decline of public-sector design and construction teams has removed a once-reliable source of training, oversight and norm-setting.

Preparing for the future

Emerging risks

The Expert Panels highlighted a series of potential emerging risks. Many of these risks are not yet visible in incident statistics but are the type of issues that CROSS is well positioned to bring to the attention of practitioners and decision makers.



CROSS HAS BECOME AN ESSENTIAL PART OF THE BUILT-ENVIRONMENT SAFETY ECOSYSTEM

AI-driven design tools

AI can bring real benefits but also risks introducing significant hazards. AI generated outputs can be ‘convincing nonsense’, data or drawings that appear credible but are fundamentally wrong. The apparent sophistication of these tools risks encouraging over-trust and discouraging challenge, particularly among less experienced designers. The danger here is both immediate – incorrect calculations leading to failure – and long term, the systemic erosion of engineering judgement. As with all design tools, they cannot and should not be used to replace the acumen of an experienced designer (see CROSS theme page on Digital Engineering (www.cross-safety.org/uk/digital-engineering) for further information on this topic).

Volumetric modular construction

VMC systems promise speed and efficiency but require a very high level of competence to install and maintain safely. Underlying assumptions can be wrong, compromising safety. An example is the assumption that there is no fire load in the cavity between modules and fire stopping is therefore

unnecessary. If this assumption is to hold, every penetration (such as pipes, cables, ducts) must be sealed. This is rarely the case.

Furthermore, unlike traditional construction, where errors are often localised or progressive, failures with systems like MMC can cause sudden and system level failures.

For examples of problems with VMC, see CROSS Safety Report: *Volumetric modular buildings and fire* (www.cross-safety.org/uk/safety-information/cross-safety-report/volumetric-modular-buildings-and-fire-1065).

Light-gauge steel framing

Light-gauge steel framing is another example of a form of MMC that demands extremely high levels of design precision and quality assurance of the work of the wider delivery chain. Even when designed correctly, it requires sophisticated engineering with every connection, seal and interface installed and fixed with a high level of accuracy. As with VMC, even the most exacting design can be undermined by weaknesses elsewhere in the cycle. Elements of the system must be manufactured correctly and backed by robust quality assurance at the manufacturer’s site. These elements then need to be transported and delivered in perfect condition to the construction site. Once there, the quality of installation and inspection must be up to standard. New opportunities for alterations to compromise performance can emerge at later stages of the project. For example, CROSS Safety Report: *Unauthorised alterations to light gauge steel framing on site* (www.cross-safety.org/uk/safety-information/cross-safety-report/unauthorised-alterations-light-gauge-steel-framing-669). The overriding lesson here is that system-level risks require system-level vigilance.

Cross-laminated timber

Cross-laminated timber (CLT) offers a range of construction, performance, and sustainability benefits. The Expert Panel, however, noted concerns related to inappropriate application of such treatments and the subsequent long-term performance under moisture ingress and fire exposure. The sector needs to be alert to instances of rot, mould, delamination and unexpected fire behaviour, which, as with the above examples, highlight the need for strong assurance and oversight. For an example of the potential risks of CLT see CROSS Safety Report: *Undetected deterioration due to rot in a cross-laminated timber roof* (www.cross-safety.org/uk/safety-information/cross-safety-report/undetected-deterioration-due-rot-clt-roof-1462).

Solar PV and battery energy storage systems

The push to decarbonise the UK’s electricity system is leading to a rapid acceleration in the use of solar PV and battery energy storage systems (BESS) in both new and refurbished



➔ CROSS-UK’s Structural Safety and Fire Safety Expert Panels met in November

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structures. This can introduce new fire risks, for example, batteries can catch fire because of the process of thermal runaway (see CROSS Safety Report: *Fire safety risks with lithium-ion batteries* [www.cross-safety.org/uk/safety-information/cross-safety-report/fire-safety-risks-lithium-ion-batteries-1058] and the CROSS Topic Paper on the same issue) creating a need for designs to include effective safety features such as fire suppression systems.

The impact of climate change

More frequent heatwaves, high winds, extreme rainfall and freeze-thaw cycles are altering load profiles and degrading materials faster than previously predicted. The transition to heavier electric vehicles is another factor which means that many existing structures will experience conditions for which they were never designed. See the CROSS Safety of structures in the climate emergency page (www.cross-safety.org/uk/safety-information/cross-theme-page/safety-structures-climate-emergency) for further resources on this topic.

Disabling of life-safety systems during refurbishment

Expert Panel members raised concerns about incidents in which automatic opening vents (AOV), sprinklers, and smoke-control systems have been disabled or compromised during refurbishment. These types of failures rarely appear in national statistics but can pose significant risks.

For examples, see CROSS Safety Report: *Automatic opening vents covered during remediation work* (www.cross-safety.org/uk/safety-information/cross-safety-report/automatic-opening-vents-covered-during-remediation-work-1380), CROSS Safety Report: *Sprinkler system deactivated during construction works* (www.cross-safety.org/uk/safety-information/cross-safety-report/sprinkler-system-deactivated-during-construction-works-1336) and CROSS Safety Alert: *Smoke vents rendered inoperable by building work* (www.cross-safety.org/uk/safety-information/cross-safety-alert/smoke-vents-rendered-inoperable-building-work).

Wider blind spots

Stepping back, many of these emerging risks highlight two wider blind spots that are creating systemic risks to safety across the built environment: innovation outpacing regulation; and overreliance on product testing.

Innovation outpacing regulation

VMC and light-gauge steel are examples of products or systems that are being adopted rapidly and at scale, before their real-world performance is fully understood. As a result, regulation has not caught up with this level of

application. The RAAC and cladding crises demonstrate how big problems can remain invisible until a series of failures converge.

Over-reliance on product testing

The Expert Panels raised concern about the tendency to conflate a product passing a specific test and its safety in the real world. New construction products can be engineered to pass a generic test that has almost by definition been designed for older materials and systems. This may very well not capture the potential failure modes of an innovative product.

A product may, for example, include just enough protective material to survive the standard exposure, yet fail catastrophically under slightly more severe (or more realistic) conditions. Despite this, many practitioners continue to treat a passing test as definitive proof of fitness for purpose. When new products enter the market, it is rarely sufficient to rely solely on existing tests. Designers and specifiers must engage critical judgement and satisfy themselves that a product is genuinely safe in context, not merely compliant on paper.

Conclusion

CROSS's 20th anniversary is more than a moment of celebration. It is a reminder of the enduring importance of learning,

openness and shared responsibility. Much has been achieved. CROSS has become an essential part of the built-environment safety ecosystem. It is a trusted reporting system, a platform for collaborative learning, and now the national voluntary reporting system created by the Building Safety Act.

Yet the Expert Panels' discussions highlighted a challenging paradox. While many of the fundamental causes of failure have remained constant throughout CROSS's history, the pace of change across the sector is accelerating. New technologies, tighter commercial pressures and generational turnover all have the potential to expose and amplify long-standing weaknesses that undermine safety. In this landscape, CROSS and its expert volunteers have a critical role to play. Their work in providing early warnings, capturing authentic data and fostering a culture of transparency will be more important than ever. But sustaining that impact depends on individuals and organisations continuing to contribute reports so that CROSS can build its evidence base.

Professional institutions can help by encouraging their members to treat reporting as a core professional duty, but the wider industry needs to step up and help promote CROSS as a safe, anonymous and effective route for raising safety concerns.

What is CROSS?

Collaborative Reporting for Safer Structures (CROSS) helps professionals to make structures safer by publishing safety information based on the reports it receives and information in the public domain.

CROSS operates internationally in the UK, US, and Australasia. All regions cover structural safety, while CROSS-UK also covers fire safety.



SCAN ME



How reporting to CROSS works

The secure and confidential safety reporting system allows professionals to share their experiences to help others.

Professionals can submit reports on safety issues related to buildings and

other structures in the built environment. Reports typically relate to concerns, near misses or incidents. Find out more, including how to submit a safety report, at <https://bit.ly/cross-safety>. Your report will make a difference.