

# CROSS Safety Report

## Concerns over robustness of some 20-year-old buildings

This month's CROSS report highlights the challenges associated with commercial and programme pressures which must be balanced against the need to produce a safe design.

### Overview

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### Report

A correspondent is concerned about the robustness of several two-storey buildings with which their design team were involved in the early 2000s. It was a stressful time with a high workload and there was pressure on the design team, some of whose members were inexperienced.

The structures generally had masonry support walls and precast



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floors. The architects kept pushing for thin walls, small support piers, and short or no buttressing returns. There was resistance to using steelwork over its cost. Furthermore, the architects sometimes specified floor insulation between the precast floor and the screed. This negated any membrane action the floor topping/screed could have provided.

A large internal review resulted in remedial work to a number of the buildings. However, the dreadful collapse in Miami in June 2021 of a much larger building has reawakened the correspondent's recurring concerns as to whether they had done enough at the time.

The correspondent says emphasis should be placed on:

- | not succumbing to cost and time pressures
- | having a very thorough checking regime
- | not always trusting people to follow instructions.

### Expert Panel comments

The panel has sympathy for the reporter who has clearly been worrying about this for some time. It is reassuring to see that an internal review led to building modifications and it is hoped that this, and subsequent actions, addressed the reporter's concerns and that they are simply reporting to raise the issue so others

don't have similar problems.

It was good to see that the potential risks had been identified and an internal review had been instigated. However, it should never have been allowed to get to the point where members of the organisation were so worried about the safety of a project.

The report raises wider issues because we know from feedback to the Institution of Structural Engineers (IStructE) that designers are generally uncomfortable with being able to demonstrate robustness. It is also known that some designers do not

### Key learning outcomes

#### Owners:

- | Ensure design teams are allocated sufficient resource and time

#### Architects and designers:

- | Collaborate closely with structural engineers and understand their recommendations

#### Civil and structural engineers:

- | Do not succumb to time and financial pressures that compromise design principles
- | Are encouraged to seek a review of their work by a competent person
- | Do not allow yourself to be compromised on quality
- | Follow your firm's quality management requirements

## “ IF SHOWN TO BE UNSAFE, THE COMMERCIAL PRESSURE IS NO DEFENCE

grasp the fundamental principles of stability, so there is a key message that robustness for even relatively simple structures can be problematical; indeed, many of the reports to CROSS are related to such problems. There should be an overriding expectation on structural engineers to provide resilient and robust structures, irrespective of height and consequence class.

The IStructE publication *Stability of buildings* is a helpful guide as to how buildings are engineered to have stability and robustness.

### Design validation

This report raises the absolute need to have an experienced engineer review the design before it leaves the office and to stand up to architects, or others, who keep asking for minimum structure as opposed to sound loadbearing elements. This is not uncommon, especially with inexperienced teams. Designers should always ensure that designs are properly checked and that any decisions taken that increase risk, as a result of external pressures, are justified and recorded.

There are always going to be cost and time pressures and younger engineers need to learn how to deal with them and act in accordance with their professional responsibilities to themselves, their clients, and the wider community. Some practical considerations are:

- | Don't extrapolate beyond ratios and proportions that are known from experience to be safe without very careful consideration. The CROSS recurring theme of scale.
- | Don't eliminate unquantified benefits to the stability of a design (i.e. screed laid on floor planks) without careful consideration of what it might mean to loss of hidden factors of safety.
- | There is no problem having

insulation under screed as long as lateral stability is assured; perhaps by having a structural topping.

- | Never rush design work and always ensure independent checking of the overall principles at the very least, as well as the details.
- | Thin walls supporting precast units may lead to inadequate bearing due to both the tolerances in the construction of the wall and the length of the plank as delivered to site.
- | If an engineer is being pushed to use thinner walls the potential risk of inadequate bearing needs to be considered both at the design stage and on site.
- | With decarbonisation rightly forcing better utilisation, buildings can become more efficient. However, that should never be at the cost of strength and stability. The need for robust detailing will become ever more prevalent in future.

### Balancing commercial pressures

Remember that whatever the commercial pressures are, if something goes wrong, the law will get involved. If injury is caused or people are exposed to unacceptable levels of risk, there may be a criminal investigation. That part of the law would focus on the duty of the designer to produce a safe design. If shown to be unsafe, the commercial pressure is no defence.

Designers should therefore always ensure that designs are properly checked. Where decisions are taken that increase risk as a result of external pressures these should be justified and recorded.

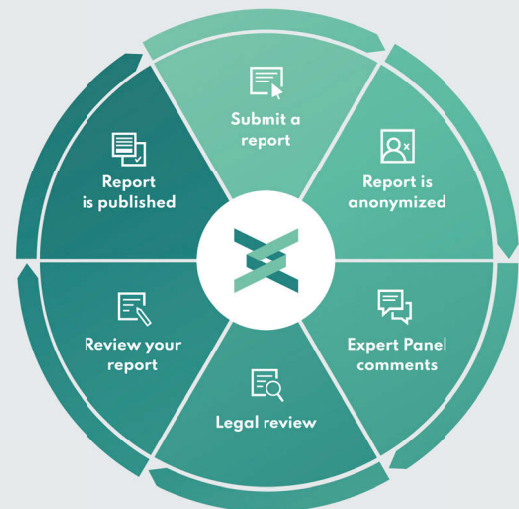
Finally, designers should be encouraged to seek reviews of their work by a competent person. Independent reviews are helpful not just in ensuring good practice but assisting with learning and team development. In 2009 SCOSS published a guidance paper, *Independent review through peer assist*, which set out the relevant principles and is a useful reference.

The full report, including links to guidance mentioned, is available on the CROSS website (report ID: 1051) at [www.cross-safety.org/uk/safety-information/cross-safety-report/concerns-over-robustness-some-20-year-old-buildings-1051](http://www.cross-safety.org/uk/safety-information/cross-safety-report/concerns-over-robustness-some-20-year-old-buildings-1051).

## 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.



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### 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.



# CROSS

COLLABORATIVE REPORTING FOR SAFER STRUCTURES