

CROSS Safety Report

Failure of beams in listed building

This month we present a report on conversion and refurbishment work on a listed building that led to structural failures of beams and subsequent difficulties in resolving safety matters between the various agencies involved.

Report

A reporter who is a consulting engineer has been working on a listed manor house. Parts of the building are nearly 500 years old and other parts are about 200 years old. It had been converted into flats about 20 years before the reporter was shown a timber beam, across a main room in one of the flats, which had completely failed.

Additional floor loading leads to beam failure

The beam and the floor joists above were supported on proprietary steel props. The flat was occupied, and the owner has had to live around a number of props in their accommodation. The reporter's investigation revealed that the beam was undersized but had failed as a result of new heavy stone floors being added during refurbishment works above.

The reporter then identified another beam over the living room in another flat which was on the point of failure.

Dangerous structure notices on listed buildings

A year after first visiting site the reporter was asked to attend again and was appalled to find that there had been no progress – the owners of the flats were still living in unsafe conditions. The reporter was told that the job was being held up by the planners and, in particular, the conservation officer. The reporter then contacted the local authority building control department flagging up what they considered to be dangerous structures and was told that the local authority had no authority to issue dangerous structure notices on

listed buildings.

The flat owners are therefore at the mercy of the local authority planning department who are not treating this with the required urgency. This case has flagged up a number of questions as follows:

- | Why was the structure not checked and reinforced when the building was converted into flats?
- | Why did the leases to the flats not contain clauses which clearly and specifically forbade laying heavy floor finishes?
- | If the local authority building control officer is not prepared to issue dangerous structure notices what protection do the leaseholders have?

Expert Panel comments

Local authority building control has powers in relation to dangerous structures. In general terms this allows them to remove the danger. If this was used too liberally in complying with dangerous structures legislation, then listed buildings legislation could be breached. Safety would always come first but the safeguard is that the building control team must liaise with their listed buildings colleagues as to the suitability of what work can be done.

Notices on listed buildings

Notice can be served on a listed building but would only be done where there was imminent danger. This is always a judgement call for a dangerous structures' surveyor and all the more difficult when a listed building is concerned. They may have taken the view that the proprietary props being

in place was sufficient to remove the imminent danger.

The reporter could revert back to the building control team stating that the site has been revisited and concerns remain that other beams may be on the point of collapse, and that proprietary props are not appropriate as a long-term solution.

The reporter does not state who their client is, but there must be an overall freeholder, or commonhold company who has responsibility for the premises as a whole, irrespective of individual leases.

When the building was converted, the existing fabric may not have been checked as the use remained the same and therefore the loading was the same. It is unlikely that a leaseholder would have considered

Key learning outcomes

For architects and designers:

- | Liaise with structural engineers when making conversions to listed buildings because adding load, or removing support, may cause distress to ancient elements of the building
- | Liaise throughout with the local authority planners and building control to avoid clashes with different areas of legislation

For civil and structural design engineers:

- | Be sensitive to the behaviour of old materials, methods of construction, and the effects of age

For the construction team:

- | Be wary of all alterations to existing walls and floors and check with the designers and engineers in case of doubt



NOTICE CAN BE SERVED ON A LISTED BUILDING BUT WOULD ONLY BE DONE WHERE THERE WAS IMMINENT DANGER



FIGURE 1: The Notre-Dame de Paris fire in 2019 happened while the building was under restoration

structural loading when installing new flooring within their property, unless this had been specifically brought to their attention.

Fire safety information

Fire safety information is required to be given to owners under regulation 38 of the Building Regulations. It would seem to be a good idea to have a similar requirement for structural information, so as to inform future owners. Particular attention must be paid to fire safety when carrying out work on old buildings. A number of high-profile fires have occurred in the process of carrying

out work on such buildings including Windsor Castle 1992, Glasgow School of Arts 2014, 2018 and Notre-Dame de Paris 2019 (**Figure 1**).

Finally, irrespective of any action by an authority, it is incumbent on the building owner to address this matter and submit suitable proposals to the planning authority as the ultimate responsibility lies with them.

The full report, including links to guidance mentioned, is available on the CROSS website (report ID: 1016) at www.cross-safety.org/uk/safety-information/cross-safety-report/failure-beams-listed-building-1016.

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.



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.



The Drawing Board

TheStructuralEngineer

Enter a sketch in the next competition – deadline 5 April 2024

The Drawing Board is *The Structural Engineer's* quarterly sketching competition, judged by Ron Slade FStructE of WSP.

Sketches must be:

- hand drawn (no CAD, except for 'guided free-hand')
- from a real project or assignment
- at a suitable scale for publication (i.e. not too intricate/detailed).

Please also submit a short description (150 words) to put the sketch into context.

To take part, submit your entries to: tse@istructe.org

Each published entry will receive a free single e-book from the Institution's current list of titles.

Background sketch by Kevin Lyons (Lyons O'Neill)