

CROSS Safety Report

‘Design’ for alterations to a dwelling carried out by an unsuitable person

This month’s report raises concerns about the structural design for the removal of a loadbearing wall during a refurbishment.

Reporter’s submission

The reporter, an experienced chartered structural engineer, was called upon to review the design for the removal of a loadbearing wall during the refurbishment of a residence. A builder was already on site and the client had engineering calculations and marked up architect’s drawings showing the structural information. However, the builder had stopped work since they found the engineering design to be unsatisfactory and the structural designer was not responding to their queries. The reporter was therefore asked to review the structural design and recommend a way forward such that the works could be completed.

The design showed four steel beams, steel columns, some lintels, and new foundations. It did not show how applied loads had been calculated and did not allow for any wind loadings. No calculations had been provided to show how the beams should be framed with the columns to provide sway stability. The structural information showed new foundations, but trial pits dug by the builder revealed competent existing foundations which could be reused. The builder and building control body had agreed that two of the proposed new structural members could be omitted since there was no loading applied to them, and they were not required for reasons of stability.

Following the reporter’s review of the design and discussions with the building control body, it was agreed

that the original design could not be modified, and a redesign was required. The reporter agreed to produce a new design, together with drawings and submit these to the building control body for approval.

During the reporter’s review of the original design, it became apparent that:

- | the original structural designer had not visited the site – they had based their design on the architect’s drawings
- | the original designer was not associated with either the Institution of Structural Engineers or the Institution of Civil Engineers
- | details of the designer’s firm were not registered with Companies House

Key learning outcomes

For property owners and clients:

- | Incompetent structural design may lead to a building collapse and loss of life
- | Conversions and changes to domestic dwellings can be structurally complex
- | You should be satisfied that structural designers are competent before appointing
- | All structural design should be signed off by a suitably qualified and experienced person (SQEP) such as a professional civil or structural engineer

For civil and structural design engineers:

- | Refrain from design work where there is insufficient opportunity to visit the site
- | Inspect existing buildings before designing any changes to the structure

→| the designer’s website did not give the name of the business owner nor the names of any staff. It also did not give any contact telephone number

The reporter considered that, in failing to examine the existing structure, the original designer’s input to the project fell short of expected standards, and that the ‘designer’, was most likely not competent or qualified to design building structures.

In the reporter’s view, people who are not qualified or competent are setting themselves up as structural designers. When problems arise on a project, such unsuitable people may simply disappear. Furthermore, domestic clients can be taken in by such people – often on the basis of a well-presented website. To the client, computer-generated calculations may appear to be professional, however under examination, the calculations may be incorrect.

In the reporter’s view, such people present a risk to the public and action should be taken against them where appropriate. Finally, the reporter advises that clients should use the services of chartered structural engineers such as those listed on the Institution of Structural Engineers’ Find An Engineer website (www.findanengineer.com).

The full CROSS Safety Report, including links to guidance mentioned, is available on the CROSS website (report ID: 1236) at www.cross-safety.org/uk/safety-information/cross-safety-report/design-alterations-dwelling-carried-out-1236.

Expert Panel comments

The householder was fortunate in that they employed a competent builder who recognised the likely inadequacies of the 'design'. The builder, in pausing work and waiting for the design to be reviewed, potentially prevented a collapse. CROSS receives many reports about structural designs being undertaken by persons who appear not to be competent, particularly in respect of work undertaken in the domestic residential market. CROSS Safety Report: *Incompetent design of simple steel beams* (www.cross-safety.org/uk/safety-information/cross-safety-report/incompetent-design-simple-steel-beams-1183), published in 2023, is just one example. Incompetent persons who issue designs not only risk lives but are also likely not meeting their legal obligations.

Conversion and changes to domestic dwellings can be complex and demanding. Identifying potential conceptual structural schemes and developing appropriately elegant, effective, buildable, and economic solutions, requires significant knowledge, skills, and experience. Any requirement to remove loadbearing walls must not be treated lightly, as both the temporary and the long-term stability of the dwelling could be put at risk. People too often think that the walls they wish to remove, are only there to take vertical loads, when they may well be essential for the lateral stability of the whole building. Buildings may collapse if walls are removed without measures to safeguard the overall stability of the building. Clients should understand that structural engineering, domestic work included, is a complex discipline that should only be entrusted to a suitably qualified and experienced person (SQEP) such as a professional civil or structural engineer.

Clients must appoint competent designers

Clients should be aware that not every engineer, even if chartered, is competent to undertake all designs; their suitability will depend upon their experience and knowledge of the type of building being worked upon. As a minimum, a structural designer should be expected to be a member of a professional body that regulates structural designers, normally the Institution of Structural Engineers or the Institution of Civil Engineers. CROSS once again recommends that all structural designs, domestic scale work included, be signed off by a SQEP, such as a professional civil or structural engineer.

Domestic clients have an important role in making sure that the people they bring in to do work are capable of doing it in a way that avoids harm to anyone. This applies to both designers and contractors. The Health and Safety Executive provides guidance for domestic clients including what they need to know about The Construction (Design and Management) Regulations 2015 (CDM 2015) (<https://www.hse.gov.uk/construction/areyou/domestic-client.htm>).

Designers should visit sites

It appears that the original designer did not visit the site. Competent designers will understand the value derived from inspecting an existing building before designing any changes to the structure. An inspection, amongst other things, enables the designer to understand the existing construction materials, the condition of those materials, previous changes to the building, existing load paths, and how the structure will respond to the proposed changes. Very little of this can be fully gleaned except by inspecting the structure. An inspection also allows the designer to consider what further 'opening up' of the structure is required to validate their design. Designers should refrain from undertaking work where there is insufficient opportunity to visit the site. Conversely, any person who proposes structural changes to an existing building, without inspecting it, could have their competence queried.

Designers should also consider what site inspections would be sensible during the works.

It can be that too much reliance is placed on the sign off of building control. Building control bodies do not create risks and therefore are not responsible for them. The draft code of conduct for registered building inspectors requires that they do not carry out design activities. This includes not advising contractors, designers, or clients on how to proceed. Only a competent designer can advise on matters of design.

CROSS Safety Report: *Inadequate design for basement works* (www.cross-safety.org/uk/safety-information/cross-safety-report/inadequate-design-basement-works-1132), published in 2022, also about works to a residential property, considered issues of designer competency and overall building stability.

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.