



The dangers of a facelift

Statistics from the Health and Safety Executive show that more than a third of construction fatalities occur on refurbishments. The advice in our guide will help you avoid adding to the tally.

Refurbishment is a hazardous activity. Projects often involve demolition and rebuilding, which come with their own risks. They also require work to be undertaken on old buildings, which may contain hazardous materials or be incapable of bearing the loads associated with the construction process.

A further hazard arises from the fact that many refurbishments are carried out in public places. This imposes significant restrictions on the project, which need to be accounted for in the design phase.

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The hazards addressed in this guide are:

- **Collapse**
- **Exposure to harmful substances**
- **Falling from height**
- **Working on confined sites**

Collapse

You should ensure that the structure to be refurbished is not overloaded. This entails:

- **Making sure that the load-bearing strength of the existing structure is calculated, and specified on your drawings**
- **Identifying the elements of the existing structure that are essential for its stability, then making sure these elements are not removed. If they have to be removed, you should make provision for specialist temporary works**
- **Ensuring that the forces applied during construction do not exceed the capacity of the existing structure. This is important when you think about the specifications of the new building, and any temporary works that will be needed during the construction phase**

You also need to take account of the impact that factors such as wind may have on the stability of the structure.

Exposure to harmful substances

When working on existing buildings, it is worth remembering that harmful substances might have been used in their original construction. Typically, you might discover:

- **Lead, in paint (for further guidance, see SIT106 Lead-based paint)**
- **Arsenic, in wood preservatives**
- **Asbestos (for further guidance, see SIT105 Asbestos survey and management)**
- **Horse-hair in plaster**
- **Combustion by-products in chimney flues**

If any of these substances feature in the original structure, you should avoid specifying construction processes that will lead to their release. For example, you should not require lead-based paint to be grit-blasted, as this will release the lead, and cause a health risk to workers.

If you are uncertain about how to deal with hazardous materials located on your site, consult a specialist.

When it comes to the new elements of your design, you should take care not to specify materials or assemblies that are harmful to health (for example solvent paints), or unsafe to work on or near (for example fragile materials).

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Falling from height

This risk is greatest when work is being completed near unguarded edges, or newly-created openings in floors and external walls. While it is always best to eliminate the need for workers to operate in such places, it is often unavoidable.

In these situations, you should incorporate elements into your design that facilitate the use of temporary edge protection or personal protection equipment. For further information, see CON306 **Temporary works** and CON307 **Fall prevention by design**.

Working on confined sites

Refurbishment projects are frequently carried out on congested sites, such as town centres or inside buildings, where space is at a premium. This imposes significant constraints on the work – for example, by limiting the amount of room available for a crane, or organising access around traffic and pedestrians.

To help contractors deal with such constraints, you should:

- **Restrict the size of building components so that they can be lifted by the size of crane available, given the space on site. See CON302.1 Crane information for more details**
- **Ensure that components that are to be manhandled into place are light enough for workers to carry. You should also make sure they can be moved around the site – through corridors, say, or restricted doorways. Further guidance is available in CON301 Manual handling and vibration and CON301.1 Manual handling information**
- **Allow as much off-site prefabrication as possible**
- **Be sure to specify components that can be carried by the size of vehicle available, given the constraints on space. This applies in relation to the delivery and installation of building materials**

Get the knowledge

Find out as much as you can about the existing structure, so that you can mitigate some of the hazards addressed in this Guide. As a minimum, you should ascertain the following information:

- **The age of the building. This will indicate whether a design code existed when it was built, which will help you identify structural materials that may be present. Brief details about design codes and standards is provided elsewhere in this Guide**
- **The building's structural form. This enables a full analysis of the existing structure, which will help you to ascertain its loadbearing strength. It will also help you to plan how new elements will interact with the existing structure**
- **The condition of the existing building. This should include information about faults, such as dry rot in timber or carbonation of concrete, that will have an impact upon the strength of the structure**
- **Background information about the building. This may include information about its past uses, which will provide an indication of the substances likely to have been used in its construction. You should also ascertain the nature of any restrictions that apply to the site – for example those relating to traffic, or the need to maintain access to the public**

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A guide to design codes

The following guide provides information about design codes and standards, and when they were introduced. By cross referring these codes with the age of your building, you will have an indication of the materials, design techniques, and assumptions concerning strengths and load-bearing that prevailed when it was built.

Steel

BS 449: 1932, 1948, 1959, 1967, 1969
BS 5950:1985, 1990, 2000

Concrete

CP 114: 1957, 1969
CP 110: 1970
BS 8110: 1985

Masonry

CP 111: 1948, 1964, 1970, 1972
BS 5628: 1978

Useful resources

Publication 138 Appraisal of Existing Iron and Steel Structures (Steel Construction Institute)
CIRIA Report C579 Retention of Masonry Facades Best practice Guide
CIRIA Report C589 Retention of Masonry Facades Best Practice Site Handbook
Appraisal of Existing Structures – 3rd Edition (Institution of Structural Engineers)
Building Construction and Drawing by CF Mitchell (BT Batsford Ltd)
Publication 11/84 Historical Structural Steelwork Handbook (BCSA)
The BCSA is the national association for the steel construction industry.

See elsewhere on SID:

SIT105 Asbestos survey and management
SIT106 Lead-based paint survey and management
CON301 Manual handling and vibration
CON301.1 Manual handling information
CON302.1 Crane information
CON306 Temporary works
CON307 Fall prevention by design
DEM601 Demolition, dismantling and decommissioning