Site notes, field sheets and checklists

A written record of what was done during the survey is required and should be kept on file for future reference. This may be needed to deal with further enquiries from clients at a later stage and would certainly be necessary in order to defend a complaint or claim. The record should show details of the conditions applicable at the time of inspection, the checks made and what was seen. It should also show, for the avoidance of doubt later on, what may not have been seen and what parts of the building were inaccessible.

The written record should be clear enough that another surveyor could look at the notes later and be able to understand what was done and seen during the inspection. There could be circumstances where the original surveyor is no longer available to translate his or her handwriting and there may be a complaint or claim to deal with.

The normal way to do this is for the surveyor to use an A4 clipboard with pro forma site notes, field sheets and checklists. This will demonstrate methodology. The surveyor will have in front of him or her, the necessary prompts and reminders and a system of recording information. An example of a pro forma field sheet for a Building Survey is shown on the following pages. When completing the form it is always a good idea to consider how it might appear later if it were produced in court in relation to a negligence claim.

BUILDING SURVEY/HOMEBUYER REPORT
Field sheet and checklist

SURVEYOR: **REVISED 5th October 2005**

PROPERTY ADDRESS:

JOB NO. **ANY ASSOCIATED JOB NO.**

DATE OF INSPECTION:

TIME OF INSPECTION: Start Finish

TYPE OF INSPECTION: BSR/HBR

WEATHER: Dry/overcast/rain

ORIENTATION: North/South/East/West – Facing

VIEWING ARRANGEMENTS: Keys/agents. Vendor in occupation. Met at property.

LIMITATIONS OF INSPECTION: Furnished Carpeted Occupied Contents

TYPE OF PROPERTY: DH SDH ETH TH SDB DB PBF CF OTHER

DATE OF CONSTRUCTION:

AGE OF EXTENSIONS/CONVERSION ETC:

UNUSUAL FEATURES:

SITE: Level? Trees? Subsoil (GSM)?
Mining area? Flood plain?

FLATS: Lease term (years) Ground rent (£) Service charge (£)
Common Parts Lift Porterage
Communal heating/hot water External decorations or other works due?

COMPARABLES (For HBR or BSR with valuation refer to schedule in MVR site notes)

VALUATIONS (For HBR) OMV (£) INSURANCE (£)
Gross External Floor Area m^2
(additional notes overleaf . . .)

ROOF SPACES:

Sketch

Covering

Underfelting

Ridge/Hips

Rafters

Purlins

Struts

Collars

Joists

Hangers

Binders

Wallplates

Ceilings

Insulation

Gable/Party Walls

Wiring

Plumbing/tanks

Ventilation

Gang nail truss: Bracing Strapping

Limitations on inspection

Access hatch Decking

Insulation Contents

Action Points

Insulation? Underfelting? Ventilation?

Lag pipes/tanks? Strengthen timbers?

Ceilings? Chimney breast support?

Party walls fire stopped? Rot or beetle?

(additional notes overleaf . . .)

FIRST FLOOR:

Sketch

Ceilings (plasterboard, 1&p)

Outer walls

Partitions

Floors (firm – joist depth)

Windows

Doors

Radiators (small/micro bore)

Plumbing

Sanitary ware & Bathroom

Wiring

Cupboards

Fittings

Chimneys

Decorations

Limitations on inspection

Floors covered

Furniture

Action points

Plasterwork/ceilings?

Decorations?

Plumbing/sanitary ware?

Windows?

Movement?

(additional notes overleaf . . .)

GROUND FLOOR:
Sketch

Ceilings (plasterboard, 1&p)
Outer walls

Partitions

Floors (timber/solid)

Windows

Doors

Radiators (small/micro bore)

Plumbing

Sanitary Ware

Wiring

Cupboards

Fittings

Chimneys

Decorations

KITCHEN (appliances not integrated?)

Limitations of Inspection	Action Points
Floors covered	Plasterwork/ceilings?
Furniture	Decorations?
	Windows?

SERVICES: Electricity Fuses/RCCB unit? Earth bonding to services? Any major works since 1st January 2005 needs NICEIC or Building Regs.

Gas Old pipework still live? Flues/ventilation? Meter location? (*Note*: All boilers installed after 1st April 2005 **must** be condensing type installed by CORGI with log book)

Water Supply pipe lead? Embedded in solid floors? Water pressure?

Central Heating Boiler? Radiators? Circulation pipework?

(additional notes overleaf . . .)

DAMP, TIMBER, HAZARDOUS MATERIALS

SKETCH

DPC material seen?

Any recent work?

DPC 150 mm clearance to outside levels?

DPC bridged Gutter splash etc?

Timbers

Wood boring beetle?

Wet rot?

Dry rot?

Basement/cellars Tanking? Ventilation? Flood risk?

Limitations to inspections and tests

Action Points

Check with vendor for reports and guarantees?

Specialist report on damp required?

Asbestos Check List
Soffits
Flue pipes
Water tanks
Textured coatings
Corrugated roof sheets
Asbestolux sheets/garage ceilings/boiler cupboards
Pipe and tank lagging
Thermoplastic tiles

Specialist report on timber required?

Lower exterior ground levels?

Attend to rain water goods?

Clear debris from sub floor areas and sweep out?

Improve sub floor ventilation?

(additional notes overleaf . . .)

EXTERIOR ELEVATIONS:

Sketch (Show movement/cracking where applicable)

Chimneys

Flashings/soakers

Roof covering

Parapets/valleys

Eaves

Gutters

Rain water pipes

Walls

DPC

Woodwork

Extensions

Movement

WINDOWS
2000 Building Regs: all habitable rooms except kitchens above ground floor opening windows 0.33 m^2 min
450 × 450 mm sill max
1100 mm above inside floor

(FENSA/Build. Regs needed for double glazing after April 2002)

Limitations on Inspection	Action Points
Roof areas not visible?	Woodwork/Redecoration?
Ivy/climber on walls?	Pointing/rendering?
Flat roofs/parapets not seen?	Roof/stacks/rain water goods?
Adjoining gardens/non-public areas not entered?	Movement? Engineers' report?

(additional notes overleaf . . .)

SITE AND DRAINS:

Sketch (Show manholes and drain runs where traced)

TREES

Species

Height/distance

SITE

Outbuildings

Boundaries?

Rights of way?

Shared access?

DRAINS

Drain flow

Trees near drains?

Drains under buildings?

Open gullies?

Limitations on Inspection	Action Points
Drains not located?	Legal adviser, rights of way, boundaries?
Drains blocked?	Tree management?
Access from curtilage and adjacent public areas only?	Drains test advisable? CCTV survey?

Shared drains first used before 1st October 1937 (1st April 1965 Inner London Boroughs) are public sewers – refer defects to main drainage authority. From those dates shared drains are private sewers – liability extends beyond curtilage.

Equipment

Lighting is needed for roof spaces, under floors, cellars and other dark areas. I find it advisable to carry a lead light with extension lead so that mains powered lighting can be used whenever mains electricity is available. There is better substitute for mains lighting for this purpose and a 100 or 150 W rough service bulb is ideal. When mains electricity is not available one of the modern rechargeable halogen torches is best although the rechargeable batteries to these generally have a fairly short life and they need to be charged up frequently.

Tapes, laser measuring devices and folding wooden rules are useful for taking dimensions. Short steel tapes are best for small dimensions with longer tape measures for external and land measurements. Wooden rules can be inserted between floor boards to check the depth of floor joists.

Ladders are needed for gaining access to roof voids and for inspecting low-level roofs externally. There are a number of 'surveyors" ladders on the market specifically designed to dismantle or fold up so that they can be carried in a car boot.

An important attribute for any surveyor is that he or she has a good head for heights and is reasonably sure-footed when clambering into lofts or onto roofs. Rubber soled shoes with good grip are advised and you should always take great care setting up a ladder to ensure that it is correctly angled and properly grounded. As a student surveyor I was once sent up a long extension ladder onto the flat roof of a block of flats not, as I discovered later, so that my valued opinions could be given, but to test my resistance to vertigo. Access to roof voids, the roofs themselves and underfloor areas often require strenuous acrobatic feats and as the years go by and the waistline expands these become more challenging.

It would indeed be unfortunate if, many years from now, the skeleton of a surveyor should be discovered, firmly wedged between the rafters in an empty and long abandoned building. They would know that it was a surveyor because the clipboard and notes would still be there with a final note 'rafters closer together than normal spacing'. So it is a good idea to make sure that someone back at the office knows where you are when working alone, and that you carry a mobile phone.

Moisture meters are necessary for testing plaster and woodwork for damp and the instrument should be tested prior to use on each occasion since it is important that a meter with failing or flat batteries should not be used since its readings will then be inaccurance and unreliable.

Binoculars will provide a clearer view or roofs and upper storeys and a selection of tools and manhole-lifting keys are required for gaining access to the drains. A hammer and bolster are useful for easing tight manhole covers. A long spirit level is needed to check plumbness in walls and whether floors are level. A plumb line could be useful for checking the verticality of walls from upper windows or balconies. A selection of tools including probes to check timber for rot and a key for opening electric and gas meter boxes should be carried. Mirrors are useful for peering around corners under floors and within ducting.

For general purposes I carry the following equipment in my car:

1. A4 clipboard with pro forma site notes, field sheets and checklists.
2. Folding or sectional 'surveyors" ladder.
3. Laser measuring device, linen and steel tapes and wooden rule.
4. Mains powered light and extension lead plus rechargeable torch.
5. Moisture meters.
6. Binoculars.
7. Spirit level and plumb line.
8. Selection of manhole keys, claw hammer and bolster.
9. Mirrors.
10. Identity documents.
11. Selection of tools including meter box keys, screwdrivers and wood probes.
12. Protective gloves and face masks.
13. Digital camera.

Inspection procedures

You should follow a methodical procedure which will often be determined by the layout of the site notes or field sheets being used. There is no right way or wrong way to inspect a house but in my view it is generally preferable to begin on the inside at the top and finish on the outside at the bottom, if for no other reason than that you are less likely to subject the owner's carpets to wet or muddy feet and ladders. For example, the procedure for a conventional dwelling house might be:

1. A preliminary inspection of the whole property to establish the type and layout and to determine what ladders and other equipment may be needed.
2. An inspection of the accessible roof spaces.
3. A room-by-room inspection at each floor level starting with the topmost floor.
4. An inspection of accessible basements, cellars and sub-floor areas.
5. An examination of the roofs externally using binoculars and surveyors' ladder.
6. An examination of the various elevations.
7. Inspection of site boundaries, outbuildings and surroundings.
8. Location and inspection of the drains.

Detailed procedures

The recommended detailed procedures under each of the preceding headings are as follows.

Preliminaries

The surveyor notes the general character and description of the property, that is, whether detached, semi-detached, terraced, end of terrace and number of storeys. If terraced it is advisable to note the overall length of the terrace and check for obvious signs of movement or rebuilding to other parts of the terrace.

The foundations serve a detached structure in isolation and that structure will not normally require provision for movement unless it is very large. A long terrace or a large block of flats has to be viewed as a single structure and the surveyor must consider if the entire building has been designed to resist the forces to which it will be subject including possible differential ground movements and thermal expansion and contraction.

Many examples of terraces of old house will be encountered, some very long indeed, built with no provision for movement. It is always a good idea to look at the flank walls at each end of a terrace for signs of leaning or bulging.

The surveyor must note the general lie of the land and the gradient on which the building stands. Houses built on sloping sites are obviously more likely to suffer from structural movements as compared with houses built on the level and in the subsequent inspection the surveyor will be looking from signs of past structural movement (see *Morgan* v. *Perry* p. 186).

Reference should be made to the Geological Survey Map for the area prior to inspection and the surveyor will be placed on guard against the possibility of problems if the subsoil shown is a shrinkable clay, or peat, or if old mine workings, gravel pits or quarries are shown. In areas affected by Radon gas, the Radon map will have been checked and in an area affected by past coal or other, mining records of this will be consulted.

In the 1950s house we might expect to find cavity wall tie failure, asbestos–cement materials, wet rot to external woodwork, poor quality flat roofs and other problems associated with that era but not the woodworm, wet and dry rot, defective lath and plaster and roof problems common in Victorian construction.

Roof spaces

A sketch is a good idea, showing the layout of roof timbers with a note of the principal timber sizes and spacings. The type of covering, whether underfelted or not should be noted together with the condition of any gable or party walls, valleys and ceilings. Depth and type of ceiling insulation should be noted and any accessible wiring and plumbing checked. Detailing around chimneys should be inspected and if any chimney breasts below have been removed the manner of support for oversailing brickwork or stonework should be confirmed.

A lot can be learned about the history of the building within the roof space and in most old houses the main defects are likely to be found either at the top or at the bottom. It goes without saying that great care should be exercised when moving about within the roof. If there is a double layer of insulation the location of ceiling joists or their suitability to take the weight of a well-nourished surveyor may be doubtful. The surveyor is not expected to take undue risks on behalf of his or her, client.

Room-by-room inspection

You have to be methodical about this and avoid distractions. The writer draws a sketch and marks on this type of ceilings, walls, floors, windows and fittings. Power and lighting points are marked together with radiators. Clients will want to know if there are very few, or no, power sockets or if a particular room lacks a radiator.

Surveyors normally tap the walls and ceilings to check what they are made of, and stamp on the floors for similar reasons. With experience you can distinguish between ceilings and stud walls surfaced in plasterboard from those surfaced in lath and plaster. Similarly, the difference between a suspended timber floor and a solid concrete floor is usually fairly obvious. However, there will be cases where the result of this type of stamping and tapping is inconclusive and if you cannot confirm what a ceiling, wall or floor is made of, then say so in the report and follow this up with any necessary additional advice.

It is at this stage that any damp testing is undertaken and a careful check made around the skirtings, under windowsills and at other vulnerable points for damp and associated timber defects. Doors should be opened and closed and door heads checked for slopes indicating past movement.

Basements, cellars and sub-floor areas

As with the loft a great deal of useful information about a house can be gleaned from a cellar so if you are fortunate to find a cellar or basement spend some time there checking the accessible construction and services. Take care when descending the cellar steps since rot and beetle attack to timbers in cellars is very common and sometimes the steps are unsafe.

Cellars below damp-proof course, and not tanked, will be inherently damp and need good ventilation. Check for signs of flooding since if the storm drainage system around the house becomes overloaded during heavy rainfall the cellar may actually take in water. It is not uncommon to find a sump set into a cellar floor with electric pump operating from a ball valve, to pump out ground water percolating in through the sides, if the cellar is below the surrounding water table.

External inspection of roofs

The number of chimney flues should be noted so that a check can be made to trace these through to the fireplaces below. If fireplaces have been removed and the flues are redundant then air-vents should be provided at the base of the flues with hooded pots or ventilated caps at the top to provide a flow of air up

the flue to keep it dry. If there are open fires or appliances using the flues then clients should be advised to have the condition of the flue linings confirmed and a smoke test carried out.

The condition of parapets, flashings soakers and other detail should be noted. Tile dentils or cement fillets are often used to seal the joint between tiles, slates or other coverings and the adjacent stacks and walls. These are rarely very satisfactory in the long run and often crack and leak. Properly formed lead flashings using code five lead or similar, well chased and pointed into the brickwork are much to be preferred.

The sloping roof coverings should be examined paying particular attention to cracked, slipped or loose tiles or slates. Hip and ridge tile bedding mortar will often be found to be cracked and loose. Generally, this should not be repointed but the tiles lifted and rebedded in new mortar using a suitable hip hook to restrain the bottom tile.

The roofs over older terraced buildings, especially Victorian and Edwardian houses, often feature fire walls in the form of sloping parapets carried up on top of the party walls and the detailing to these is frequently poor. Good flashings are needed to seal the joints with the tiles or slates. Modern practice is to provide flashings only dressed down over the tiles in contrast to the traditional (and better) flashing and soaker arrangement. Walls should be finished with throated copings stones set on damp-proof courses and the pointing to brickwork or stonework needs to be in good order. Beware of vegetation such as weeds or even small saplings found growing out of the brickwork to this type of parapet – a sure sign of excessive weather penetration and possible problems with plasterwork and timbers below.

Where accessible flat roofs should be inspected from windows above or using a surveyors' ladder. If you go onto a flat roof take care since there is a possibility of soft or rotten decking which could be in danger of collapse.

The elevations

I recommend that each elevation be sketched using a simple line drawings. If cracks are present they can be shown on the sketch with the crack size indicated using suitable notation. I have found that photography is often not much use with the smaller cracks which do not show up well in a photograph although is large significant fractures are present then photographs of these would be worthwhile.

Window and door openings should be checked to see if they are square and walls generally to see if they are plumb. Movements due to spreading arches, sagging bay bressumers and settlements should be noted. Look out for leaking down pipes and gutter spash at the base of solid walls which may well correspond to areas of dampness found inside.

The site and surroundings

The condition of boundary walls and fences should be noted and especially any retaining walls. Rebuilding boundary or retaining walls can be very expensive should such be required. Driveways and other paved areas should be checked. Cracked and uneven paving could raise issues of liability to visitors. Paving should always be at least 150 mm (two brick courses) below the damp-proof course or internal floor level whichever is the lower, with a slope away from the walls to good storm water drainage unless some form of basement tanking or vertical damp proof coursing is present.

Outbuildings, swimming pools and other facilities should be inspected to whatever standard is required by the signed and agreed terms and conditions of engagement. Frequently these may be excluded from the report.

Drains

Hopper heads, soil vent pipes and other drainage above ground should be inspected and accessible manhole covers within the curtilage lifted in order to check the drainage system below ground. Having regard to the risk of damage and the health and safety issues arising the surveyor is not expected to remove manhole

One hundred typical defects in residential property

This is a list of the one hundred most common issues raised in my experience in Building Survey reports requiring action by the client or giving rise to some warning in relation to a future repairing liability or affecting the value of the property. This list is not intended to be exhaustive but should be of interest.

1. Materials containing asbestos.
2. Cracks to walls.
3. Condensation.
4. Poor quality flat roofs.
5. Rot to external joinery especially lower frames and sills.
6. High external ground levels bridging damp-proof courses.
7. Leakage from poorly designed shower enclosures.
8. Poor sound proofing in converted flats.
9. Sub-standard electrical installations.
10. Defective drains.
11. Non-compliance of gas installations.
12. Lead plumbing.
13. Contaminated land issues raised by legal advisers following environmental searches.
14. Defective heating systems.
15. Bulging flank walls.
16. Wall tie failure.
17. Condensation in double-glazed sealed units.
18. Spalling and frost damaged brickwork and stonework.
19. Sub-standard loft conversions.
20. Damp basements and cellars.
21. Inadequate bay window support over double glazing.
22. Old roof coverings lacking underfelting.
23. Flooding in the locality.
24. Radon gas.
25. Mining subsidence in locality.
26. Mundic construction in Cornwall.
27. Settlement of solid ground floor slabs.
28. Woodworm, mostly Common Furniture Beetle.
29. Dry rot under floors, behind panelling and in flat roofs.
30. Leaking parapet and valley gutters.
31. Inadequate means of escape in the event of fire from flats.
32. Poorly insulated ceilings in lofts.
33. Lack of party/fire walls in old terraced roof spaces.
34. Sagging and spreading of roof timbers.
35. Condensation in old chimney flues.
36. Failure of damp-proof courses.

37. Leakage of water into wall cavities from concrete 'Finlock' gutters.
38. Cracked and leaning boundary and retaining walls.
39. Tree roots posing risk to structure.
40. Coastal erosion.
41. Failure of old lath and plaster ceilings and partitions.
42. Leaking gutters and down pipes.
43. Inadequate support when chimney breasts are removed.
44. Shortage of power sockets.
45. Inadequate ventilation to bathrooms and showers.
46. Inadequate ventilation to kitchens.
47. Poor septic tank and cess pit drainage arrangements.
48. Inadequate sub-floor ventilation to timber ground floors.
49. Excessive service charges to blocks of flats.
50. Cracked and loose external rendering.
51. Poor woodwork and sash cords to sliding sash windows.
52. Hazardous large sheets of ordinary quality glass to walls and partitions.
53. Excessively steep staircases and inadequate balustrades.
54. Flat roofs used as terraces without proper wearing surface.
55. External electrical circuits not in armoured conduit.
56. Adjacent high-voltage pylons, electrical sub-stations and mobile phone masts.
57. Problems with shared drives and private access roads.
58. Inadequate management arrangements for blocks of flats.
59. Damp and rot to timbers due to leaking washing machines and dishwashers.
60. Cracking and shelling to wall plaster.
61. Lamination of clay and concrete roof tiles.
62. Nail sickness and cracking to old slate roofs.
63. Lack of wind bracing to modern gang nailed truss rafter roofs.
64. Damp penetration and staining to walls from leaking overflow pipes.
65. Settlement of blockwork partitions resting on timber floors.
66. Poor quality supporting platforms for water tanks and cylinders.
67. Excessive bounce to floors due to over spanned joists.
68. Leaning chimney stacks.
69. Leaking service and heating pipework embedded in solid floors.
70. Sub-standard extensions converted into habitable rooms.
71. Inadequate covers and lagging to water tanks in lofts and on flat roofs.
72. Rot to floors under leaking flush pipes and waste connections to water closets.
73. Builders' rubble and other debris left under floor boards blocking ventilation.
74. Galvanic corrosion to old galvanised steel water tanks.
75. Header tank overflow pipes run into adjacent cold-water tanks.
76. Foundation settlements on shrinkable clay soils.
77. Foundation settlements due to leaking drains causing subsoil erosion.
78. Lifting of foundations by ground heave due to clay swell where trees removed.
79. Inadequate damp proof membranes in solid concrete ground floors.
80. Integral garages with inadequate protection against spread of fire into the main building.
81. Wet rot to painted softwood frames to porches and conservatories.
82. Cavity walls lacking damp proof cavity trays and other detail.
83. Tree roots in drains.
84. Inadequate encasement of steelwork and insufficient cover to steel reinforcement.

85. Removal of internal walls and chimney breasts compromising structural stability.
86. Use of spiral and open riser staircases which do not comply with Building Regulations.
87. Porous thatched roofs attacked by squirrels and other vermin.
88. Brick and blockwork garages with inadequate piers and/or roof strapping.
89. Poorly installed and potentially dangerous loft ladders.
90. Inadequate cavity fire checks, breather membranes and other detail in timber frame houses.
91. House Longhorn Beetle in the Weybridge area of Surrey.
92. Lack of asbestos management arrangements for common parts to blocks of flats.
93. No proper pavement crossover for forecourt parking.
94. Storm water soakaway systems completely blocked and needing relaying.
95. Hot-water pumping over into loft header tanks.
96. Furring up of cylinders and pipework in hard water areas.
97. Failure to obtain listed building or conservation area consent where these apply.
98. Thermal expansion and contraction causing cracks to Calcium Silicate brickwork.
99. Death watch beetle in old damp hardwoods especially Oak.
100. Neighbours undertaking works to party walls without necessary agreement.

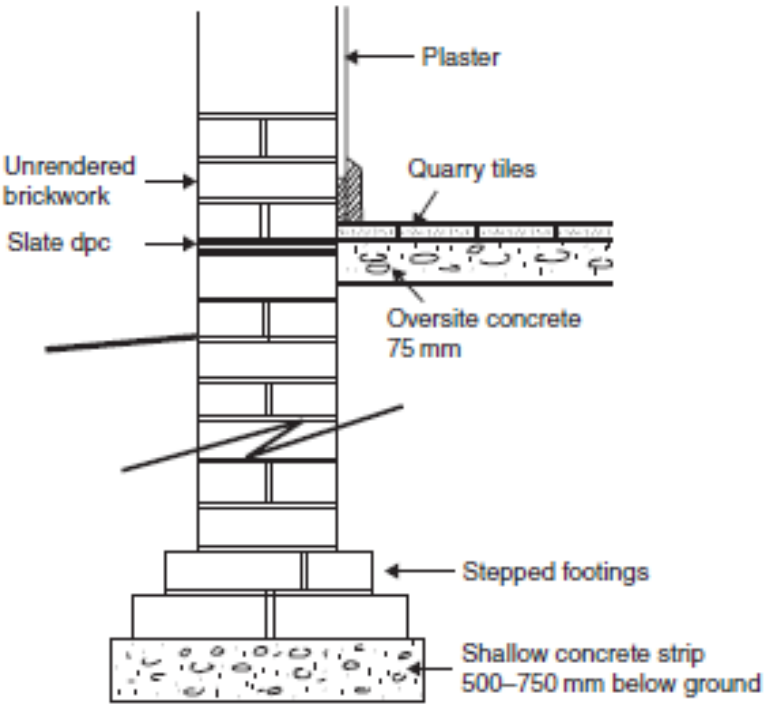


Fig. 3.1 Late Victorian foundation, circa 1900.

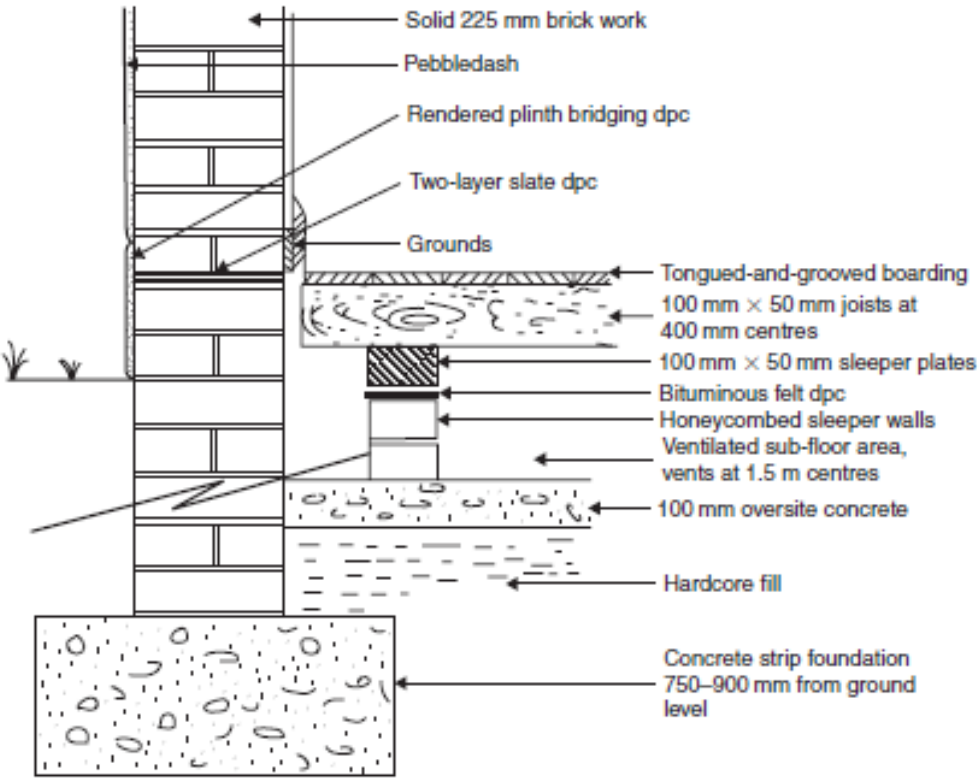


Fig. 3.2 Typical 1930 domestic foundation.

Subsoils

Care is required on chalk soils to ensure that the foundations are at least below the minimum for frost damage since chalks can be subject to considerable frost heave close to the surface.

Despite Biblical claims to the contrary, sandy soils make good foundation bases in many cases, although high-frequency vibrations in the range of 500–2500 impulses per minute can cause serious settlement problems, a point unlikely to arise with residential structures unless near to machinery. This factor should be borne in mind when dealing with industrial structures, particularly in the case of changes of use involving machinery.

Fig. 3.4 This settlement fracture has been poorly repaired and opened up again indicating continuing movement.

Fig. 3.5 A bulge fracture due to compression not related to foundations.

deal with foundations which are (a) not deep enough, or (b) not wide enough, or (c) not firm enough, for the particular subsoil conditions involved. The traditional remedy for such defects would be to underpin foundations in such a way as to make the overall structural support to the footings either deeper, wider or firmer as needed.

First one must consider those cases where such work would be unnecessary or premature. A number of specialist underpinning contractors exist who undertake traditional or system methods using interrupted foundations of various types. Such contractors will be commercially orientated and will wish to emphasise the advantages of underpinning using their own particular system. A surveyor will need to consider whether or not it is necessarily in the client's best interests to refer a problem to such a contractor rather than to a professionally independent structural engineer.

The first matter to be considered would be available evidence of actual past and present damage to the structure under review, having regard to age and all circumstances. Initially, any above-ground damage would need to be assessed, for example, cracks in walls (inside and outside), evidence of distortion to window and door openings, sloping floors and irregular ceilings. The Building Research Establishment (BRE) Current Paper 'Foundations for Low-rise Buildings', CP 61/78, and 'Assessment of Damage in Low-rise Buildings' in *BRE Digest* 251, make certain recommendations for the assessment of crack damage as follows:

Category 1 Degree: Very slight
Fine cracks up to 1 mm wide which can be treated during normal decoration.

Category 2 Degree: Slight
Cracks up to 5 mm wide, some external repointing may be required to ensure weather-tightness. Doors and windows may stick slightly.

Category 3 Degree: Moderate
Cracks between 5 and 15 mm wide, or a number of cracks up to 3 mm wide.

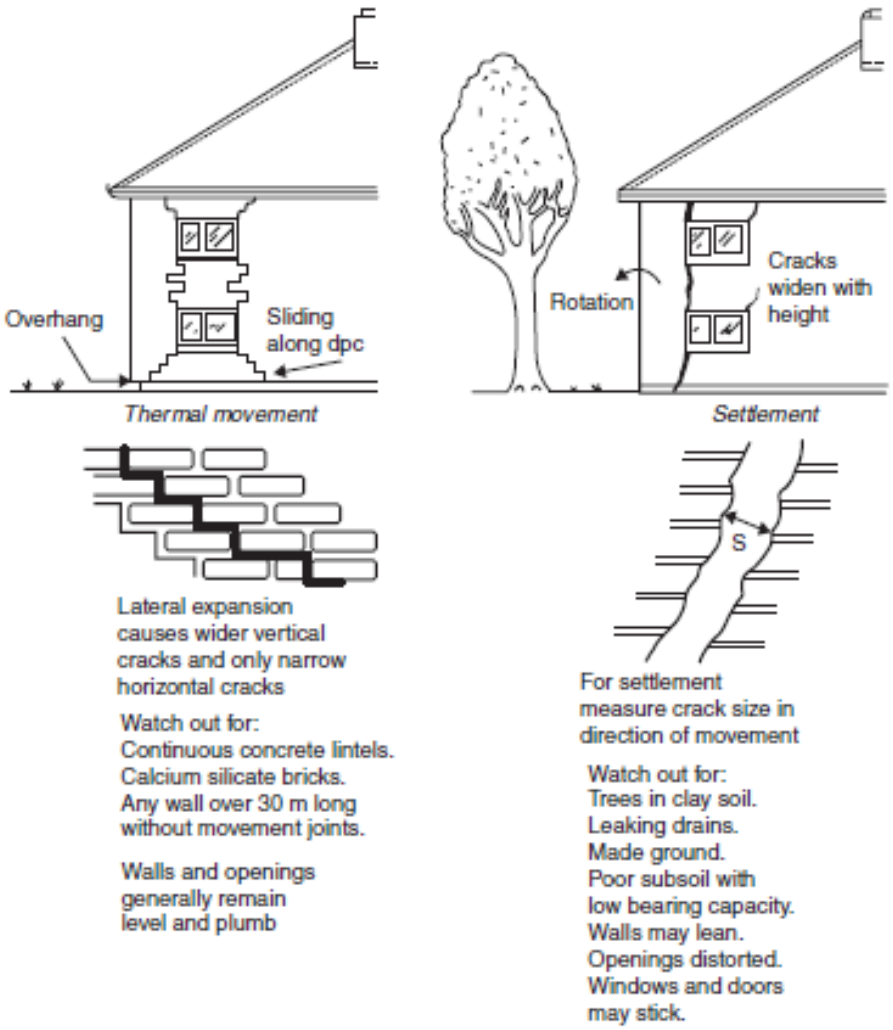


Fig. 3.6 Assessing crack damage – 1.

Cracks require opening up and stitch bonding by a mason, with repointing to exterior brickwork. Doors and windows sticking. Service pipes may fracture. Weather-tightness often impaired.

Category 4 Degree: Severe

Cracks between 15 and 25 mm wide, but also depending upon numbers of cracks. Extensive repairs needed to sections of walls. Window and doorframes distorted, floors sloping, walls leaning or bulging. Some loss of bearing to beams. Service pipes disrupted.

Category 5 Degree: Very Severe

Usually 25 mm or more but depending on number of cracks. Requires major repair involving partial or complete rebuilding. Beams loose bearings. Walls lean badly and need shoring. Window glass cracks. Danger of instability.

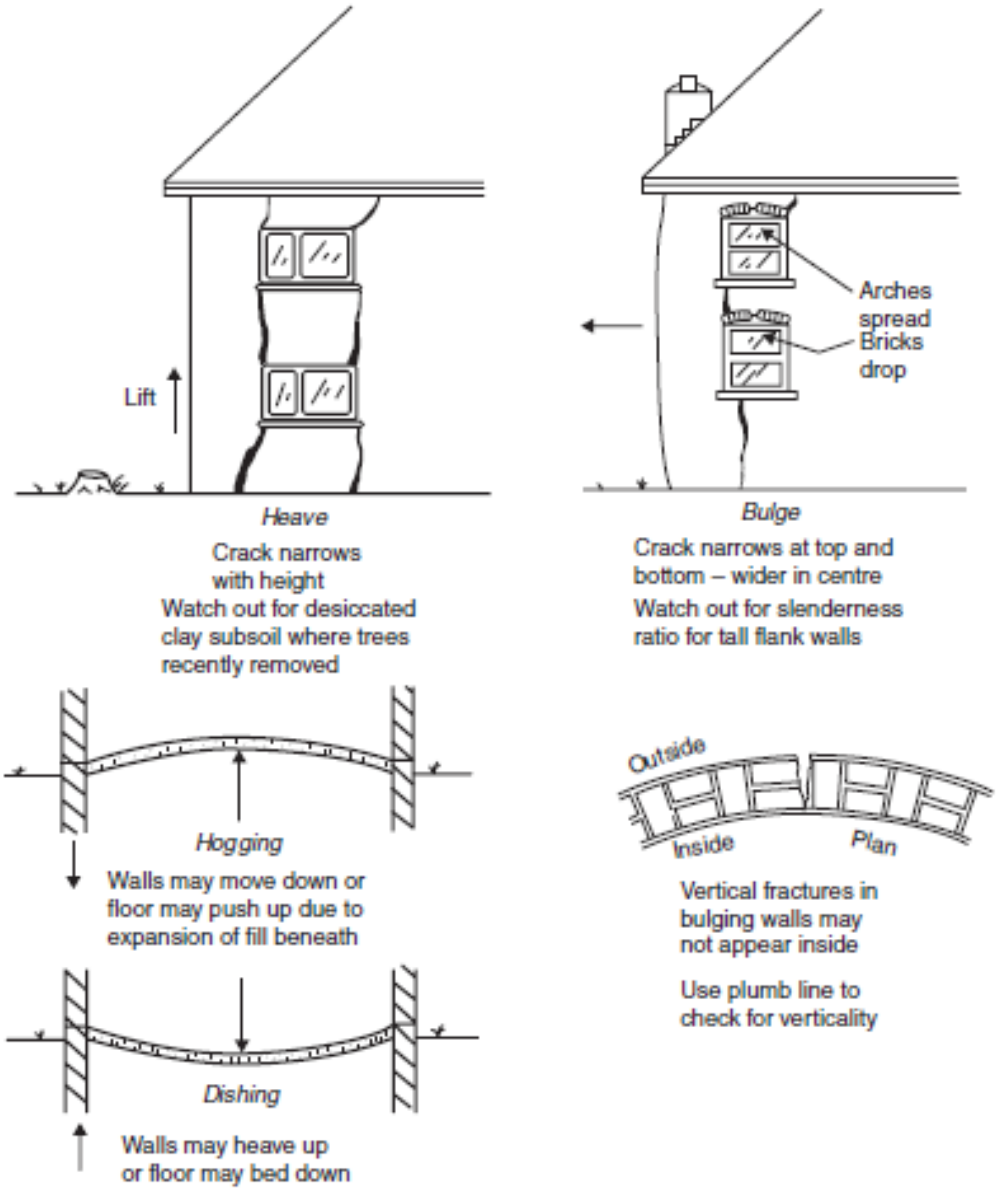


Fig. 3.7 Assessing crack damage – 2.

Category 3 damage could require a specific remedy depending upon the circumstances. Certainly such damage would require periodic monitoring in order to confirm whether or not the structural movement is continuous and worsening.

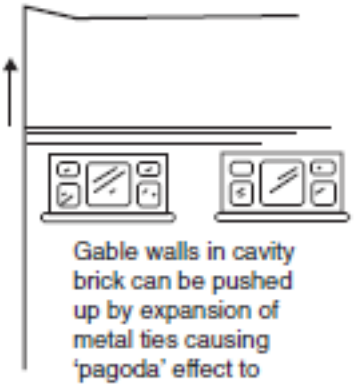
Categories 4 and 5 damage will probably require a specific remedy in addition to above-ground repairs. There is a likely need for some type of underpinning in these cases.

Rusting wall ties

Pattern of horizontal cracking to mortar joints in cavity wall. There may be bulging and separation of two skins of brickwork.

Watch out for:
Any pre-war cavity walls.
Black ash mortar.
High exposure for driving rain.
1950s Finlock gutters with leaking joints.

Cracks tend to appear every six courses, this being typical wall tie spacing.



Gable walls in cavity brick can be pushed up by expansion of metal ties causing 'pagoda' effect to verge tiles.

Overloading

Vertical cracks to piers indicate compression failure with wall eventually bursting laterally.

Watch out for:
Slender brick piers, especially at corners and bays taking high loads.
Weak stonework.

Shear failure

Often to bonding between new and pre-existing construction.

Fig. 3.8 Assessing crack damage – 3.

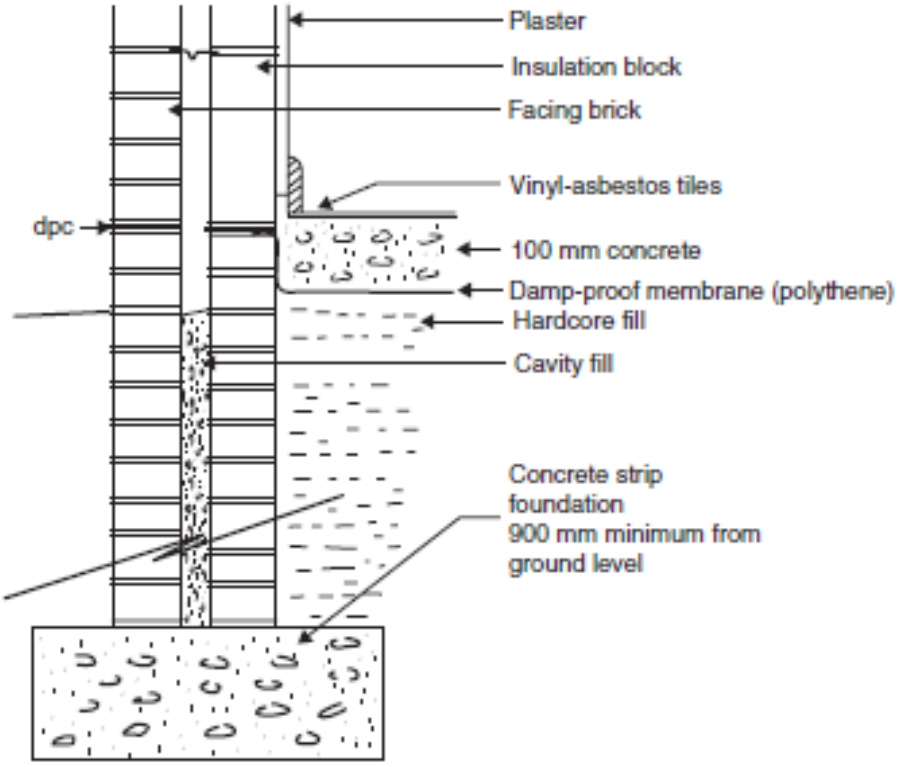


Fig. 3.9 Typical 1970 domestic foundation.

Fig. 3.10 Settlement or subsidence. The crack widens with height.

Fig. 3.11 Subsidence damage inside house.

Geological Survey Maps

The importance of checking details of the subsoil by reference to the GSM when necessary was emphasised in *Cormack* v. *Washbourne [1996] EGCS 196*. A survey had been carried out on a house in Knotty Green, Buckinghamshire. The surveyor did not consult the GSM which showed Reading clay overlaying the chalk. Subsequent to the survey serious faults developed in the house which had to be demolished and rebuilt, the problem being associated with both subsidence and heave of the clay soil. The case went to the Court of Appeal in December 1996. The Court held that the surveyor's failure to consult the GSM was causative of the plaintiff's damage because it was the presence of the Reading clay beds beneath the house, marked on the map, which was the cause of the damage.

Fig. 3.16 Builders will often use a very shallow foundation for a porch thinking that because the weight is low they do not need to excavate as deeply as for the main house; this is not so and the porch in this case will need to be rebuilt on deeper footings.

Height of wall	Length of wall	Minimum thickness of wall
Not exceeding 3.6 m	Any length	200 mm throughout its height
Exceeding 3.6 m and not exceeding 9 m	Not exceeding 9 m	200 mm throughout its height
Exceeding 3.6 m and not exceeding 9 m	Exceeding 9 m	300 mm for the height of one storey and 200 mm for the remainder
Exceeding 9 m and not exceeding 12 m	Not exceeding 9 m	300 mm for the height of one storey and 200 mm for the remainder
Exceeding 9 m and not exceeding 12 m	Exceeding 9 m	300 mm for the height of two storeys and 200 mm for the remainder

Dampness

The building under review should be examined and compared with an equivalent modern building constructed to current standards. The extent that it falls short of modern standards should then be considered and the client advised accordingly. A good standard would be cavity-wall construction with clear, unobstructed cavities, having damp-proof courses at the base of walls at least 150 mm (two brick courses) above surrounding ground levels and with vertical and horizontal damp-proof courses at all points of contact between the outer and inner skin, and damp-proof cavity trays at all points of bridging. Additionally, there should be an impervious damp-proof membrane in solid floors contiguous with the damp-proof courses in all walls. By such means the passage of moisture into the interior from the exterior, or the site, is avoided.

The fact that a particular building is modern will not, of itself, ensure that a good standard is met since, in practice, poor detailing of cavity walls, obstructed cavities, punctured membranes and other faults abound. Nevertheless, a good yardstick to apply is that described. In so far as any construction under review fails to meet this standard, then this should be pointed out to the client, and many older buildings will not reach this standard.

Before about 1938, much residential construction was in solid brickwork or stonework and the main barrier against weather penetration in such construction is the condition and pointing of the external brick or stone face. In such circumstances this should be explained to the client, who should be advised to maintain the exterior surfaces in good order in future years and make a particular point of checking periodically for gutter and downpipe leaks. Leaking overflows will also cause considerable damage to internal plasterwork if neglected since the moisture can easily penetrate directly to the inside.

The clearance of 150 mm between exterior levels and damp-proof courses is recommended in order to prevent gutter-splash reaching the wall above damp-proof course and to allow some margin of clearance. Experience indicates that the ground levels around houses tend to rise by about 300 mm every 100 years, due to the addition of soil to gardens and the laying of new paving over old. It is essential to resist this trend.

When there is insufficient clearance to damp-proof courses it is recommended that ground levels be lowered. A general lowering of levels is best with the surplus soil or paving being carted away. Alternatively, a channel may be formed alongside the wall, at least 150 mm wide, suitably formed with cementwork sides and benching, and having a fall-away from the main walls and adequate drainage to suitable storm gullies. A channel which fails to drain adequately is worse than useless since it will actually exacerbate any dampness. The brickwork then exposed at the base of the wall should be made good as necessary by pointing, cutting in new bricks or rendering to a suitable standard.

Vertical damp-proof courses of slates set into a rendered plinth are a traditional remedy. They are inserted between the high exterior levels and the walls where damp-proof course clearances are inadequate or the courses themselves are bridged. Such vertical courses often prove ineffective in the long run as the slates become porous and the bedding mortar between slates is rarely impervious to moisture. Any vertical slate damp-proof courses found between high exterior ground levels and the external walls

of older buildings should be regarded with a critical eye and consideration given to a general lowering of levels or tanking applied to any at basement or semi-basement.

Damp-proof courses become porous with age and rising damp results. Specialist contractors now provide remedial services either by chemical injection of the walls or electro-osmosis to prevent capillary attraction in the walls, or by inserting new damp-proof courses in sections using a bricksaw to cut out chases in the walls, generally of about 1 m at a time. Electro-osmosis is now generally considered to be less effective compared with other methods and one large specialist firm has discontinued its use. Electro-osmotic damp-proof courses should be given special consideration if encountered during a survey.

Before allowing a client to employ such a specialist contractor it should be confirmed that the dampness found actually is due to rising damp. Many cases of diagnosed rising damp are not due to failure of the damp-proof courses at all but from penetration or bridging. It is significant that guarantees offered by specialist contractors will normally exclude liability for dampness due to causes other than moisture rising up the walls by capillary action. Before employing a specialist contractor it is recommended that obvious defects likely to cause dampness should first be eliminated and the structure subjected to a period of observation, if this is possible. It will often be found that dampness can be cured by such simple steps alone.

Having said this, occasions will undoubtedly arise when dampness may be diagnosed as rising damp due to failure to damp-proof courses. In such circumstances all main walls will need attention since the damp-proof courses will be of the same age and type unless parts of the structure date from different periods. The provision of new damp-proof courses in only a part of a building and leaving the original damp-proof courses in other parts may be unwise since further work in the other areas will be necessary in due course if the damp-proof courses are failing due to their type and age.

Specialist contractors are commercial men seeking work and there is nothing wrong with that. As a professional, however, the surveyor should be able to say whether or not the specialist's proposals are unnecessary or premature.

Bridging of damp-proof courses can arise from inside the building as well as from outside. Frequently there is a build-up of rubble and debris under suspended timber floors. Whenever such floors have to be exposed for building works or services it is recommended that the over-site areas be cleared out and swept, and a check be made that all vents are free from blockage. Solid floors in older buildings may also bridge the damp-proof courses. The use of membranes in solid floors was not general practice in pre-1939 construction, and in halls, kitchens and sculleries quarry or ceramic tiles were often laid directly on the screed and thus provided a passage for moisture to rise up into the base of adjoining walls. It will often be found that plaster at the base of walls next to such floors has been affected by damp and a high moisture-meter reading obtained due to this damp transference.

In modern construction the failure to ensure that membranes are lapped over or under damp-proof courses and sealed at all joints can give rise to local bridging. Polythene can also tear or puncture, especially if laid under a concrete slab on gritty or stony blindings. Often, 500-grade polythene has been used as a cheaper substitute for the more durable 1200-grade which the writer would recommend for this purpose.

Thermoplastic tiles and woodblocks, commonly employed in houses of the 1950s, were laid in a bituminous backing which was itself the damp-proof membrane. Sometimes such tiles or blocks are removed by a do-it-yourself owner and replaced with other surfaces, the bituminous backing being disturbed or removed altogether. Modern vinyl tiles or welded sheet vinyl flooring cannot be laid with spot adhesive on a floor surface unless this surface rests over a suitable membrane. Failure to observe this will result in the floor screed sweating under flooring and causing it to lift and loosen. The bituminous backing to tiles and woodblocks should be contiguous with the damp-proof course in the walls but this may not always be so and can also be a source of bridging and moisture transference into the wall above damp-proof course level.

In older houses with damp solid floors or with timber floors in poor condition below recommended levels a useful remedy can be to have them replaced by new solid floors at a higher level. This can often

Fig. 4.3 The Victorians used special-shaped bricks as wall ties in their cavity walls.

be done usefully in kitchen and scullery areas where ceiling heights are sufficient. The ceiling height should not be reduced below 2.3 mm (the old Building Regulation minimum), preferably higher. The new floor can then incorporate a damp-proof membrane lapped at the sides and contiguous with the damp-proof courses in the walls. These should first be exposed by chasing the wall plaster and removing skirting boards as necessary. The client will then be able to lay vinyl tiles, sheet flooring or similar surfaces on the new screed in the knowledge that the floor will be dry and will not transfer moisture into the surrounding walls.

Apart from normal moisture-meter tests which should be made at selected points around the base of the main walls and at other points at risk, the wall surfaces should also be examined for signs of deterioration in the plaster, staining to wallpaper and mould growth, all signs of dampness (although not necessarily rising damp). Rust stains from skirting board nail heads are a good indicator of moisture behind the skirting board.

One final point regarding dampness in modern buildings is that in many post-1945 houses the pipework for plumbing and heating systems has been buried under solid floor screeds above the membranes and if an isolated point of dampness is found at the base of a wall, especially an internal wall, it is well worth while investigating the possibility of a leak in the system under the floor. If a serious leak is taking place from a heating system this can be confirmed by tying up the header tank ball valve, marking the side of the header tank at the existing level and then checking this level periodically to see if it drops. Any rapid loss of water from the header tank will indicate a leak to the central heating pipework in the floors which will have to be traced and remedied.

Thermal insulation

The thermal insulation requirements in current Building Regulations are reasonable standards to adopt and if the building under review is likely to be less satisfactory then the client should be warned.

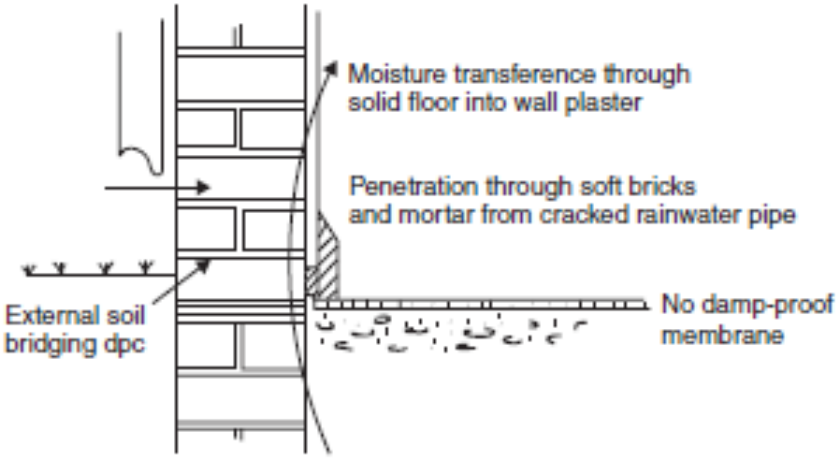


Fig. 4.4 Bridging of slate damp-proof course in unrendered, solid brick wall.

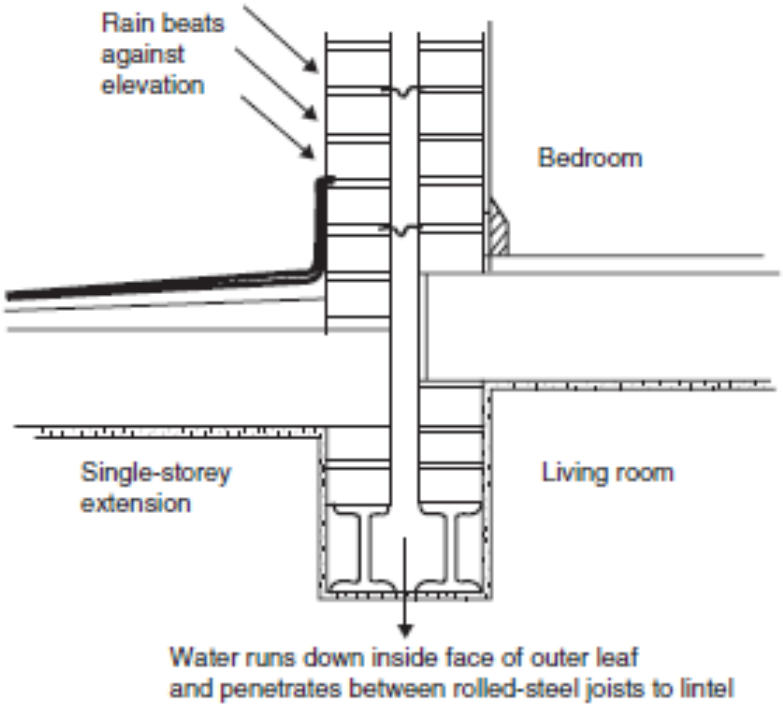
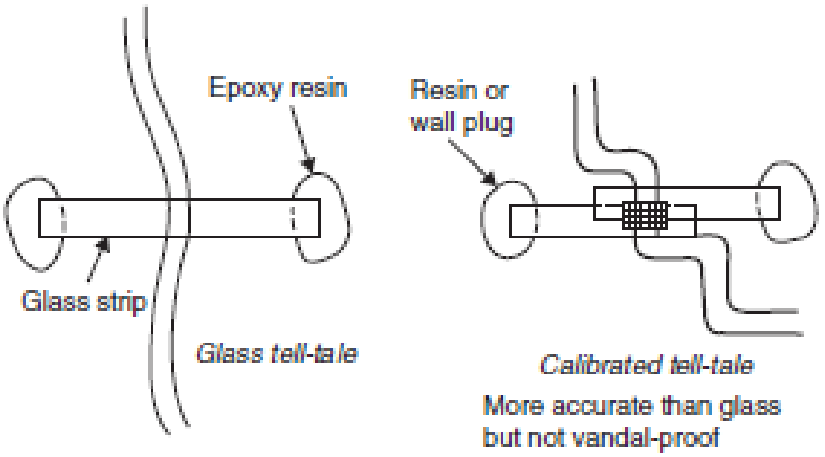


Fig. 4.5 Lack of damp-proof cavity tray to cavity wall over opening for living-room extension.

Fig. 4.6 Inadequate cover for steel reinforcement in concrete lintel. Rust can take up to seven times the space of the steel it replaces causing bursting to the concrete surface.

Fig. 4.7 Drill holes at the base of the wall indicate that a chemical injection damp-proof course has been added.



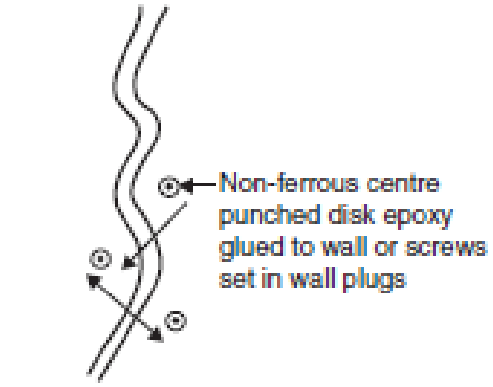


Fig. 4.8 Crack monitoring.

Fig. 4.13 The paving is too high. It should be lowered to at least 150 mm (2 brick courses) below the damp-proof course or internal floor level whichever is the lower, with a slope away from the wall.

Schedule 6, Table 1, 1976 Building Regulations (applicable from 1976 to 1985 – now replaced by Approved Documents under current Regulations).

Floor joists for dead loads of not more than 25 kg/m^2 excluding the mass of the joist

	Maximum span to centre of bearings (m)		
Size of schedule joist (mm)	400 mm spacing	450 mm spacing	600 mm spacing
38 × 75	1.03	0.93	0.71
38 × 100	1.74	1.57	1.21
38 × 125	2.50	2.31	1.81
38 × 150	2.99	2.83	2.46
38 × 175	3.48	3.29	2.86
38 × 200	3.96	3.75	3.26
38 × 225	4.44	4.20	3.66
44 × 75	1.18	1.06	0.81
44 × 100	1.97	1.78	1.38
44 × 125	2.62	2.52	2.05
44 × 150	3.13	3.02	2.64
44 × 175	3.65	3.51	3.07
44 × 200	4.16	4.50	3.93
50 × 75	1.33	1.19	0.92
50 × 100	2.10	1.99	1.55
50 × 125	2.73	2.63	2.29
50 × 150	3.26	3.14	2.81
50 × 175	3.80	3.66	3.27
50 × 200	4.33	4.17	3.72
50 × 225	4.85	4.68	4.18
63 × 150	3.51	3.38	3.09
63 × 175	4.08	3.93	3.59
63 × 200	4.65	4.48	4.10
63 × 225	5.21	5.03	4.60
75 × 200	4.90	4.93	4.33
75 × 225	5.49	5.30	4.85

See the types of floors P84 to 90

Life of roof coverings

Most roof coverings have a reasonable and well-defined effective lifespan beyond which re-covering may be necessary or trouble may be anticipated. In practice, there is considerable variation in the quality of materials from different sources, especially traditional materials, but the following is a list of the principal roof-covering materials likely to be encountered and a guide to their lifespan.

	Years
Hot-bonded, built-up mineral felt flat roofs to BS 747, well constructed	10–15
Hot-bonded, built-up felt roofs constructed to lesser standards	3–10
Good quality flat lead roofs, well detailed and laid with rolls	80–100
Good quality flat copper roofs, well detailed	30–75
Zinc roofs, well laid with rolls, in areas not subject to chemical pollution	20–40
Zinc roofs in situations of chemical pollution	15–20
Asphalt, well laid and detailed, in two coats to BS CP 144, Part 4: 1970	20–40
Hand-made clay tiles with battens and sarking felt	60–70
Machine-cut clay tiles with battens and sarking felt	40–60
Plain concrete tiles, double lap with battens and sarking felt	50–90
Interlocking concrete tiles with battens and sarking felt	50–80
Interlocking Dutch or Belgian clay tiles	40–60
Asbestos-cement tiles or roofing sheets	20–25
Good quality Norfolk reed thatch	50–60
Straw thatch	20–25
Local stone slabs (depending upon porosity)	10–100
Good quality Welsh slates with battens and sarking felt	80–100
Poorer slates, subject to lamination with age	40–60
Shingles (depending upon quality and frequency of treatment)	5–30
Perspex, clear or obscure unplasticised polyvinyl chloride (PVCu) sheets, etc. (depending upon brittleness, etc.)	5–25

Read types of roofs Page 91 to 97

Detailing

As a general rule all flat roofs should have a natural drainage fall and should not hold water. The reason for this is that ponding on the surface, especially with asphalt and built-up felt, will result in marked differences in temperature between the wet-cold areas and the dry-warm areas, especially in warm sunlight following overnight rain. This causes relative thermal movements between cold and warm parts which result in rapid deterioration of the surfaces. Generally, in new construction a fall of at least 1-in-40 is desirable to allow for possible bedding down of the construction in later life and to accommodate any minor deflection in timber joists. In existing flat roofs where any bedding down and deflection has ceased, a shallower fall may be acceptable but this should not be so shallow that the surface holds water.

Experience tends to indicate that most problems with roof construction arise at the detailing rather than the main areas of covering. Rain penetration of flashings and soakers of stacks and fire walls or to upstands and flashings at the perimeter of flat roofs is common. On close examination many roofs will exhibit a history of repairs to such details, the repairs often being of a highly unsatisfactory nature. Unfortunately the average building owner or lessee will rarely carry out any close inspections him/herself and in the event of a leak will rely upon the judgment of a roofing contractor. The eventual bill will be paid without knowing whether or not the work done was necessary, suitable or reasonably priced. Often it is only when the building is subjected to the scrutiny of a surveyor that the nature of the past repairs comes to light.

Gutters

Generally, all good roof design should incorporate the provision of adequate guttering and rainwater pipes to carry all roof water away to a storm drainage system. It is important that stormwater be taken away from the perimeter of the building to prevent damp penetration through walls and to avoid subsoil erosion from continual discharge of roof water into soil adjoining the main walls.

Certain traditional roofs encountered in period construction will not have gutters or downpipes, particularly in the cases of thatch and traditional stone slab construction where a deep eaves overhang is provided instead. It is vital with this type of construction that the area around the building should be paved, with a suitable drainage fall away from the main walls and with a good clearance between exterior and interior levels. A rendered plinth treated periodically with a bituminous waterproofing paint would also be advised. An examination of a number of thatched cottages over the years will reveal that dampness at the base of the main walls, especially on the weather-sides, will invariably be a problem unless the run-off of water from the roof slopes is adequately catered for. A combination of thatched roof, solid rendered walls of stone and lime mortar, and high exterior ground levels is often encountered; not surprisingly in such circumstances, invariably there will be a damp problem at the base of walls internally with a history of plaster repairs, or false walls applied over damp plaster.

A client proposing to buy a cottage with a thatched roof may have seen it through rose-coloured spectacles, especially if he first viewed in summertime. Such a client may have thought it quaint that visitors step down into the building instead of up, and will view uncritically the moss-covered and loosening rendering around the base of the building. The vendor's panelling to dado height around the ground floor rooms could be considered part of the charm. It may not be until the following winter that the client begins to detect the

Fig. 6.3 Modern gang-nailed trussed rafter roofs require diagonal bracing and gable-end strapping to prevent racking.

Wood work

1. The design of the main structural members and fixings to resist all forces to which the building will be subject.

2. The adequate pre-treatment of timbers against rot and beetle attack.
3. The provision of damp-proof courses and membranes.
4. The provision of vapour checks in the wall panels to prevent interstitial condensation.
5. The provision of barriers against weather penetration.
6. The provision of adequate external claddings.
7. The provision of adequate thermal insulation within the panels.
8. Breather membranes in the walls to allow trapped moisture to escape.
9. Fire checks in the cavities of connected timber frame buildings to prevent the rapid spread of fire within the structure.

Preservation

It will be appreciated from the previous descriptions of the main wood-boring insects and wood-rotting fungi that good timber preservation in the form of pre-treatment is necessary to ensure durability in new work. A surveyor's knowledge of preservation techniques is important to assess the defects which will be found in older buildings and the remedies which may be proposed.

Different species of wood show great variation in their resistance to decay and beetle attack. Generally softwoods are most vulnerable; for example, ash and beech decay rapidly if conditions are suitable. Hardwoods are more durable in most cases and may be resistant to fungal attack even in conditions where fungal activity would be likely. Oaks and teaks, for example, are remarkably durable in damp conditions. In all timbers the heartwood is most resistant to decay and the sapwood least resistant. However, the sapwood will more easily absorb preservatives so that preserved sapwood of a non-durable species can be more durable than unpreserved heartwood.

Preservation is partly a question of good design to ensure that all timber members are kept dry and are not in contact with damp oversites or masonry. The climate around timber members should be cool, well ventilated and free from excessive water vapour. Areas most at risk will be suspended timber ground floors and enclosed roof voids, especially under flat roofs. In timber-framed construction the wall panels also require careful design, especially to give protection against weather penetration, provide vapour checks and allow entrapped moisture to escape through breather membranes.

Preservation also covers the treatments and surface coatings which may be applied to timber. Any water-proofing surface applied to timber will assist in preventing fungal decay since this will present a barrier to the absorption of moisture. Exterior woodwork is normally then painted in an oil-based paint, generally with two coats plus primer. Well-painted exterior surfaces are protected from moisture absorption by the paint and this degree of protection will be good if joints and putties are carefully sealed and painted over in such a way that no small passages for moisture remain. Painted surfaces reflect sunlight

but surfaces with a hard clear finish such as varnish absorb the sunlight to some extent and this generally causes the surface to crack and peel quickly, especially on south-facing elevations.

An alternative to painting or varnishing is to give the exterior woodwork a periodic preservative stain finish so that instead of covering the wood with a surface weather-resistant shell, the treatment consists of regular brushing or spraying with absorbent preservative which soaks into the wood. It is possible that exterior woodwork treated periodically with an absorbent preservative stain will become more common in the future as the cost of traditional painting continues to rise.

To prevent fungicidal activity a wood preservative must so permeate the wood that fungal hyphae are unable to feed on it. To prevent insect activity within the timbers a wood preservative requires insecticidal defence properties against that specific species for which protection is required. Different wood-boring insects have different susceptibilities. Different treatments may be required for timbers where insects are known to be active and timbers where pre-treatment against future activity is required. In the former case eggs, grubs, pupae and adult insects may all be present in the wood and require eradication; in the latter case the protection required is protection against the ingress of egg-laying adults.

Chemical treatments should take a permanent or semi-permanent form to protect the timbers from fungal and insect attack for a suitably long period. Generally 30 years' protection would be a good standard at which to aim. This is possible because the chemicals are absorbed by and retained within the wood to a considerable depth and for long periods, unaffected by sunlight or other causes of deterioration.

Timber preservation may be undertaken in any one of five ways using chemical preservatives, these being: (a) pressure-impregnation, (b) dipping, (c) steeping, (d) spraying and (e) brushing.

Pressure-impregnation involves the use of sealed tanks of preservative into which timbers are placed, the wood preservative then being forced into the timber under pressure. This is suitable only for pre-treatment.

Fig. 7.2 A traditional brick and block house under construction in the same estate as the house in Fig. 7.2.

Treatment

Faced with an existing building which suffers from the effects of dry-rot, wet-rot or attack by wood-boring insects, a surveyor will have to make some recommendations as to a suitable course of treatment in addition to commenting upon mere facts and describing their significance.

It is suggested that the existence of wood-boring insects in timbers where the timber strength is not affected and where the activity is indicated by scattered flight holes only is best treated by spraying timbers until rejection, with an insecticidal preservative of a type appropriate for the species of wood-borer involved. The question of how far such treatment should extend into areas of adjoining timber construction is difficult, but in residential property, for example, it may be most sensible to confine treatment to the immediate area of infestation but at the same time to advise the client to have the other areas checked again after 5 years have elapsed. Thus, it may be possible to deal with the fact that flight holes indicate that insects have emerged to lay eggs elsewhere, the results of which could take some years to appear in the form of new flight holes. If timbers have been structurally weakened by woodborers it will, in addition, be necessary to recommend replacement or strengthening of weakened timbers, paying particular regard to the ends of floor joists and the stiffness of principal members in roofs.

A suitable specification for wet-rot attack may be prepared on the assumption that if the cause of damp can be removed and the timber allowed to dry out, no further attack will develop in timbers not already attacked. The specification should then include the renewal of all affected wood well back from the point of decay, the protection of surrounding timbers (necessary to prevent decay arising in the future) and the eradication of the source of dampness where this has been traced and found to have caused the attack. All new wood should be spliced and jointed into place to provide a lasting repair, free from weak points externally or inadequate weather protection. All replacement wood should be adequately pre-treated.

Specifications for dry-rot control require rather more details if these are to prove suitable, having regard to the particular nature of this fungus as already discussed. Depending upon the circumstances, a suitable specification should generally include the following specific provisions:

1. Cut out, carefully remove from site by the shortest practicable route and burn all the following: timbers showing cuboidal cracking, brown colouration, white mycelium or soft areas when probed; all sound timbers within 1 m from any of the foregoing defective timbers; all debris within roof voids, sub-floor voids or other areas adjoining, particularly timber off-cuts and similar debris.
2. Remove wall plaster, rendering, skirtings, wall panels, ceilings and other coverings as necessary to trace full extent of fungal activity in adjacent construction. Carefully clean out all exposed areas and

clean down all surfaces within a distance of 2 m from actual fungal activity. Sweep out all sub-floor voids, roof voids and similar areas. Remove all dust and debris from site by the shortest practicable route and burn.

3. Blow-lamp all masonry surfaces within an area of 2 m from area of fungal activity until surfaces are too hot to touch. When cooled, liberally apply fungicidal solution to all such surfaces.
4. Apply fungicidal solution to all remaining woodwork within 2 m from point of fungal activity in two liberal coats.
5. Make good to all timberwork in pre-treated wood which has been first given two good coats of fungicidal solution on all surfaces.
6. Make good disturbed wall and ceiling surfaces using 5 mm of floating coat of zinc oxychloride plaster over the rendering coat in the area of fungal attack and for a distance of 300 mm surrounding such area. Apply zinc oxychloride paint to painted surfaces where plaster is not to be applied and over a similar area and distance from previous attack.
7. Make good all design defects responsible for original dry-rot attack, including additional airbricks and improved ventilation, renewing defective damp-proof courses, preventing moisture penetration, eliminating condensation, clearing the bridging of damp-proof courses, repairing roof and plumbing leaks and timbers in contact with damp oversites or masonry as necessary and in accordance with good building practice.

Fig. 7.3 Flight holes of the common furniture beetle (*Anobium punctatum*) in relation to a £1 coin.

During a survey and when advising on timber treatment it is often helpful to be able to confirm the location and spacing of timbers behind surfaces in stud or similar construction. In addition to tapping the wall to check for hollow areas a useful tip is to use a compass which will indicate the location of steel nail heads and may enable the layout of timbers to be confirmed without exposure. Alternatively, metal detectors and stud sensors are now inexpensive and could form part of the survey equipment.

Condensation

Problems of decorative finish to internal surfaces will be exacerbated by the presence of excessive condensation. Condensation is a major source of complaint in post-war buildings, especially buildings with a poor level of thermal insulation to external walls and poor overall design. Condensation problems at their worst can make a building uninhabitable due to the mould growth which forms on wall and ceiling surfaces and inside cold cupboards. This problem was virtually unknown in pre-war construction and has resulted from a combination of factors including changes in living patterns and construction methods.

Causes

In order to achieve a satisfactory surface finish, the effects of dampness and condensation must be dealt with at source. It is not sufficient to cover over problem areas which will subsequently reappear. Dampness to wall and ceiling surfaces may arise either from one or any combination of five possible causes, which are:

1. Direct weather penetration from the outside.
2. Leaking rainwater equipment and overflows causing a point of penetration.
3. Plumbing leaks within walls, behind ceilings or in adjoining areas.
4. Rising dampness originating in the site.
5. Condensation.

It is necessary to distinguish dampness created by 1 to 4 and involving specific remedies from condensation problems which are more complex and difficult to eradicate. Condensation occurs when damp air comes into contact with cold surfaces. Put at its simplest, the remedy lies in raising the temperatures of the wall and ceiling surfaces to above dew point. Alternatively, the amount of water vapour in the air may be reduced. Steps could be taken both to raise the surface temperatures and also reduce the amount of water vapour in the air. By such means condensation would be eliminated.

Read Page 111 to 118

Read Chapter 9 Services

Drafting the report

In Chapter 18, I have reproduced one of my old reports, with some changes to disguise the actual address of the property. I have done so somewhat reluctantly in the knowledge that many fellow surveyors will find lots to criticise and there is nothing surveyors enjoy more than finding faults in one another's reports.

In those parts of the report dealing with defects or potential future problems there should be an order of presentation consisting of three parts:

1. the investigations made,
2. the information obtained from those investigations,
3. the advice which follows from the information.

So, for example, we may say the following.

We inspected inside the main roof space using the trapdoor and pull-down ladder set into the landing ceiling. Our inspection was limited to some extent by the reduced headroom at the eaves, insulation material and stored items.

Where seen the ceilings are original lath and plaster construction consisting of a lime plaster set into Chestnut or Willow laths. The plaster was soft and extensively broken and loose. Ceiling surfaces below were extensively cracked under the old lining papers. The life of lath and plaster ceilings will depend to some extent on the quality of the original job and the degree of exposure to dampness and vibration. All the ceilings to the top floor rooms have now reached the end of their useful life.

We recommend that you allow in your budget for replacing or underlining ceilings in new plasterboard before the next redecoration. If you are in any doubt regarding the potential costs involved you should obtain a quotation from a reputable local plastering contractor prior to legal commitment to purchase. It is not always essential to hack down the old ceiling plaster. It may be possible to apply new plasterboard to the underside of the lath and plaster using longer plasterboard nails thus avoiding much of the dust and disruption involved in ceiling replacement.

Now, of course, the client may decide to do nothing about the ceilings. Clients often forget all about the advice in the surveyor's report once they have moved in. But if one of the ceilings falls down later and this client re-reads the report he, or she, can have no cause for complaint against the surveyor.

Direct on-site dictation

An alternative method of carrying out a Building Survey and preparing a report is to dictate the report direct onto a digital voice recorder, for downloading onto a computer system, whilst walking around the property. This method is not recommended (see *Watts and Another* v. *Morrow* in Chapter 19).

There are two reasons why direct on-site report dictation can cause problems for surveyors unfortunate enough to find themselves subject to a claim.

First there are no notes on file. The report is all that there is. There is nothing to record what the surveyor did, or did not, do other than what appears on the face of the report. In the event of a negligence claim it may be difficult for the surveyor to defend the report if it appears that something has been overlooked. Notes and sketches taken using a suitable field sheet will at least demonstrate methodology and confirm that the surveyor was faced with a prompt or checklist to consider the possibility of a particular defect.

Secondly, there is no time for what the judge in *Watts* v. *Morrow* described as 'reflective thought'.

For example, the surveyor may see a damp patch on a wall and a test using a moisture meter may show a high reading. Since damp can be caused by moisture rising, penetrating or descending and might result from problems with the roof, gutters, pointing, damp-proof courses, bridged cavities, condensation or plumbing, a number of other areas of inspection have to be drawn together in order to reach a conclusion and offer advice to the client.

I take my notes in the form of sketches with simple line drawings at each floor level indicating door and window openings, chimney breasts and other points of interest. A simple sketch of each elevation will show gutters, downpipes, bridged damp-proof course and other issues.

Back at the office the damp patch inside can be seen in relation to the solid brick external wall and cracked collar to an adjacent rain water pipe. So an appropriate section of the report can be dictated following the recommended rules; first the investigations made, secondly the defect identified and finally the action the client needs to take.

Standard paragraphs and survey management software

Nowadays virtually all surveyor's reports are prepared using Microsoft Word or similar software as part of a computer-based survey management system and this speeds up the process and allows the use of standard paragraphs.

Some software systems allow the surveyor to dictate specific action points within the report and then collect these together at the end and automatically populate a list in the form of a summary with a reference to the relevant sections in the report. So at the conclusion of the report the client has the basis of a specification of works. Some surveyors take this a step further and include a list of approximate building costs.

I do not recommend that approximate building costs be included in a Building Survey report. There are two reasons. First in order to price the work accurately the surveyor will need to measure the work involved and prepare approximate quantities which will involve time and increase the fee. It may be that upon receiving the report the client will decide not to proceed with the purchase, in which case the need for estimates will not arise.

Secondly, there are many items of building work which can be undertaken in a variety of ways depending upon the client's requirements and in the absence of full knowledge of the client's needs it may be impossible to assess costs accurately. If estimates are provided the Royal Institution of Chartered Surveyors (RICS) Guidance Note recommends that the surveyor should be careful to state at some length the reservations and limitations of such advice.

It is obvious that if a surveyor advises a client that a particular defect will cost £10 000 to remedy and the actual cost turns out to be £20 000 the surveyor is vulnerable to a claim for negligence. It is a matter of common experience that the cost of building works invariably turns out to be more than the budget especially when dealing with old buildings in poor repair.

Disclaimer and exclusion clauses

It is normal for a Building Survey report to include disclaimers of liability or exclusion clauses and the professional indemnity insurers will probably insist on this as a condition of providing insurance cover.

The distinction between a disclaimer and an exclusion might best be seen in relation to a dry cleaning shop: if there is a notice on the wall saying 'We do not guarantee to get your clothes clean' this would be an attempt to disclaim liability for poor results whereas if it says 'We do not clean the right sleeves' this would be an attempt to exclude liability altogether for that part of the garment.

All such disclaimers and exclusion clauses are subject to the test of reasonableness under the provisions of the Unfair Contract Terms Act (see Chapter 19).

The following are typical examples of standard clauses which may be inserted into report to limit liability and provide standardised advice:

- *Limits of inspection*: At the time of inspection the weather was warm and dry and the house was occupied and furnished with floors covered. Fitted floor coverings have been lifted in sample areas only in order to identify the nature of the construction beneath and we have not

removed fitted floor coverings generally. Similarly loft insulation material has been disturbed only to the extent necessary to confirm the nature of the construction beneath and we have not removed loft insulation material generally. We have not inspected inside walls cavities or seen the wall ties. No exposure of hidden parts of the structure has been undertaken.

- We have not inspected any parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that such parts are free from rot, beetle or other defects.
- We inspected inside the subject flat and the common parts giving access to it together with the external elevations from ground level only and we have not seen inside any other flats in this building or any roof spaces.
- *Foundations*: We have not undertaken any trial bores in order to confirm the nature of the subsoil under this property, however, the Geological Survey Map for the area indicates that the subsoil is likely to be (xxxxxxxxxxxx).
- We have not dug any inspection pits in order to examine the foundations, however, houses of this type and age in this locality were usually constructed using conventional shallow strip foundations consisting of a concrete strip with brick footings typically laid about 600 mm to 900 mm below ground level. This is a fairly shallow foundation by modern standards.
- When buildings have shallow foundations on shrinkable clay subsoils it is generally advised that no trees or bushes should be planted closer to the main walls than their mature height because tree roots, extracting moisture from the clay subsoil, can cause damaging foundation movements.
- *Cements and concretes*: No tests have been undertaken on cements and concretes used in the construction and we are therefore accordingly unable to confirm the presence or otherwise of high alumina cement, chlorides, sulphates or other deleterious materials. As regards concretes below ground we cannot confirm that they will be suitable for the ground conditions if the subsoil contains sulphates or other damaging constituents.
- *Roofs*: Our inspection of the roofs externally has been from ground level, or using a surveyor's ladder where roofs are no more than 3 m above ground. Some parts of the roof cannot be seen due to the angle of view available.
- *Flues*: If you wish to use flues for open fires or appliances they must first be swept, the condition of the linings confirmed and a smoke test carried out. In an old building constructed in a soft lime mortar it is likely that flues would need to be relined before they can be safely used and a reputable fireplace contractor should be consulted. If flues are redundant they should be provided with air-vents at the base and hooded pots at the top to keep them dry.
- *Gutters*: Periodic checks of gutters and downpipes are advised during heavy rainfall to ensure that roof water is being taken away freely without leakage. This house has solid walls (in contrast to modern cavity construction) so any leakage of water down the walls externally can penetrate directly to the inside.
- *Timber defects*: Woodworm and other timber defects are commonly found in houses of this age in this locality. Local timber treatments and repairs will be required from time to time. This should be regarded as normal ongoing maintenance. Timbers are less likely to suffer such defects if kept dry in a centrally heated house and if the sub-floor ventilation is unobstructed.
- *Condensation*: Condensation is a common problem in this type of property. It is important to maintain the correct balance of background heating and ventilation. The temptation to dry laundry, etc. on the radiators should be avoided and some form of extraction ventilation should be provided to bathrooms and kitchens notwithstanding that these rooms may have windows. So an extractor fan, operating automatically from the light switch with a time delay is advised in the bathroom and a ducted cooker hood would be much to be preferred as compared to a simple filter hood in the kitchen.

- *Double glazing*: A problem often arises due to condensation forming between the glass in sealed units and when this happens the only remedy is to reglaze the windows which can be expensive. You should ask your legal adviser to confirm when the double glazing was installed, who did it, and whether it is covered by a long-term transferable guarantee.
- *Electricity*: An old consumer unit with fuses is located under the stairs. We recommend that the system be inspected and tested by a National Inspection Council for Electrical Installation Contractors (NICEIC) registered electrician tests to include insulation, polarity and earth continuity with a check to ensure that all plumbing and gas services are bonded to earth. Any works necessary to comply with British Standard 7671 should be undertaken. We advise replacing the fuses with a modern residual current circuit breaker (RCCB) unit and circuit breakers.
- *Gas*: We recommend that the gas service together with any gas appliances included in the sale be inspected and tested by a Council of Registered Gas Installers (CORGI) registered engineer paying particular attention to boiler flue and ventilation requirements.
- *Water*: We have not seen the main underground supply pipe from the pavement but if this is an old lead pipe it will now be due for renewal in polypropylene and this will involve digging up the front garden. Further enquiries with the vendor are advised to ascertain what is known of the age and type of main water supply pipe.
- *Central heating*: We recommend that the central heating system be inspected and tested by a CORGI registered engineer and a report on its condition obtained. Advice should be sought to confirm whether the system needs to be chemically cleansed and recharged with an inhibitor.
- *Drainage*: We inspected inside manholes within the curtilage of the subject property only and no tests have been undertaken. The drain flow within the manholes was satisfactory at the time of inspection.
- *Tenure*: The advice given in this report has been prepared on the assumption that the property is freehold with an unencumbered absolute title and with vacant possession. Some of the property titles in this area incorporate restrictive covenants which require an original freeholder's consent for alterations or extensions and you should ask your legal adviser to confirm whether any restrictive covenants apply in this case. You should also ask your legal adviser to confirm who is liable for the various boundaries by reference to the title plan and covenants.
- *Converted flats*: The standard of sound-proofing between flats is likely to be poor and you may rely for your quiet enjoyment of the flat on the consideration and cooperation shown by the neighbours above and below. Complains regarding noise nuisance are commonly made by the occupants of converted flats with timber floors. You should ask your legal adviser to confirm that there are suitable lease covenants against noise nuisance such as the playing of musical instruments at unsocial hours, etc. There should also be covenants that floors have to be kept carpeted. The modern trend to have exposed floor boards or laminated wood flooring in flats can result in considerable noise nuisance to the occupants below.

Subsequent dealings with clients

It is quite common for clients to wish to discuss the report. Clients often use the report in negotiations with the vendor in the hope of agreeing a price reduction to reflect the defects found. The surveyor may

be drawn into further correspondence regarding the property. It is important to ensure that any letters, e-mails or other correspondence emphasise that the original terms and conditions applicable to the report continue to apply and care should be taken not to make off-the-cuff remarks intended to be reassuring to the client which could rebound later. This would apply, especially to any discussion of building or repair costs or the ease with which particular defects could be remedied.

Complaints

All Chartered Surveyors are required to have a complaints handling procedure in place and in most cases it is prudent to arrange for another surveyor to visit the property to investigate a complaint, rather than allow the original surveyor to go back. In my experience most complaints are not about defects in the property but about people and their varied reactions to circumstances. Often the complaint can be resolved by explaining to the clients precisely what was included, and what was not included, in the terms and conditions of engagement which they signed.

11

Home condition, homebuyer and other pro forma reports

> Terminate or postpone the visit if the seller/occupier attempts to intimidate or abuse you in any way. Do not allow the occupier to lock doors behind you. Do not inspect after dark or at dusk. Do not enter rooms where persons are sleeping, scantily clad or obviously drugged or drunk. If the home is only occupied by children or juveniles, you must arrange to postpone your visit until a responsible adult is present.
>
> *Section 2.5.3. Home Inspector's Inspection and Reporting Requirements, Version 3, February 2005*

A distant relative of mine was a surveyor in Denmark before and during the Second World War. He went around the Copenhagen area preparing mortgage valuations for what was then a Danish equivalent of one of our Building Societies. No doubt the reports were very similar to those prepared in the UK at the same time although the construction was rather different and a lot more timber was used in Danish house construction.

For the last 12 years the Danes have incorporated into their house selling process the concept that the seller has to prepare, or have prepared, a seller's pack of information including title details and other matters which the purchaser's legal representative is then given to speed up the sale. In theory, if there is no chain and it is a cash purchase, the buyer could view the house in the morning and buy it in the afternoon.

Encouraged by the Danish experience it has been a long-standing New Labour promise to introduce Sellers Packs in the UK and at the time of writing the 6th edition of this book the necessary legislation is in place and the Information Technology (IT) and training are well advanced.

A particular feature of the new Home Information Packs (HIPs) is that they will include a Home Condition Report (HCR) which will itemise the various parts of the property and give each part a Condition Rating.

Home Condition Reports

The Housing Act 2004, Regulations made under the provisions of that Act and the National Occupational Standards for Home Inspectors taken together provide a framework for the provision of HCRs. HCRs will form part of the HIPs which it is intended will be prepared in respect of most residential properties being placed on the market for sale in England and Wales. At the time of writing the proposed date for the introduction of compulsory HIPs in England and Wales will be 1st June 2007.

Condition Rating	Definition
Not inspected	Self explanatory
1	No repair is presently required. Normal maintenance must be undertaken.
2	Repairs are required but the Home Inspector does not consider these to be either serious or urgent.
3	Defects exist of a serious nature or defects requiring urgent repair.

Report Number
Voucher Number

Instructing Office:
Reporting Office:

Residential Property Mortgage Valuation Report for Nationwide Building Society

Inspection date:

1. Mortgage Details

Applicant(s) Name(s)

Property Address
inc. postcode

Postcode

Purchase Price £ Advance Amount £ Term Years

2. Tenure

Tenure Freehold (0) Leasehold (1) or Feudal (2) If Leasehold unexpired term Years

Rent – Ground/Chief/Feu £ p.a. Fixed/escalating etc. £

Maintenance charge £ p.a. Other

If shared ownership, what % of the property is being purchased %

3. Tenancies

Is there any tenancy apparent? Yes/No If yes, please give details and rent(s) upon any agreement

4. Property Description

Type of Property Detached House (01) Semi-Detached (02) Terraced House (03) Detached Bungalow (11)

Other Bungalow (12) Purpose Built Flat (31) Converted Flat (33)

Approx. Year Built If a flat, which floor is it on? Is there a lift? Yes/No

Number of Bedrooms Number of Bathrooms (inc. ensuite bath/shower rooms) Number of habitable rooms

5. Property Construction

Main Building
Construction – Walls

Roof

Garage/Parking Space Single (1) / Double (2) / Parking Space (3) / None (4)

Is the parking space/garage offsite? Yes/No

6. Services

Mains Services Available Electricity / Gas / Water / Drainage / Other

Type of Central Heating None (0) / Full Gas (1) / Full Electric (2) / Full Oil Fired (3) / Full Solid Fuel (4)

Part gas (5) / Part Electric (6) / Part Oil Fired (7) / Part Solid Fuel (8)

7. New Properties (if applicable)

Name of Builder NHBC / Zurich / Architect / Other

Are roads / footpaths made / partly made / unmade Estimated cost of making up £

8. Buildings Insurance

Estimated current re-instatement cost including site clearance and professional fees excluding VAT, except on fees £

Floor area – Main Building m²
Garage if not integral m²
Other Buildings m²

Does this property need to be referred due to special insurance risks? Yes/No If Yes include appropriate key statements in Section 10 – General Remarks

9. Other Matters that may Materially Affect value
(If applicable give more detail in the general remarks below)

Is the property readily resaleable at or about the valuation figure?	Yes/No	In the case of flats etc. is proper management / maintenance apparent?	Yes/No
Has the property ever been affected by structural movement caused by subsidence, settlement, landslip or heave	Yes/No	Is the risk of further movement on the Society can accept? (If No decline property)	Yes/No
Rights of way / Easements / Servitudes / Wayleaves (where apparent on inspection)	Yes/No	Building works that may have required Planning Permission / Building Regulation approval	Yes/No

Any other important factors? Yes/No If Yes give details:

10. GENERAL REMARKS (including the general condition of the property)

11. WORKS TO BE CARRIED OUT as condition of mortgage subject to retention below. (Listing should only include work absolutely necessary to protect the society's security. The amount of advance must be ignored)

Amount of Recommended Retention (Minimum retention amount is £1000. This is not an estimate of costs. The Applicant(s) should obtain detailed estimates before proceeding with the purchase) £

12. VALUATION FOR MORTGAGE PURPOSES – (assuming vacant possession unless otherwise stated)

Is the property a suitable security for the Society	Yes/No
If Yes, valuation in present condition	£
Valuation upon completion of any works required under section 7 or 11	£
If shared ownership, value of share being purchased	£

I certify that I have personally inspected the property and that in making this report I am not contravening Section 13 of the Building Societies Act 1986, or any variation or re-enactment of it.

Valuer's Signature

Name and Qualification
Firm's Identity Code

Date

Firm
Address

Postcode
Telephone
Fax Number

IMPORTANT NOTICE TO APPLICANT(S)

This report has been prepared solely for the Society's purposes. It is not a structural report and is based upon a limited inspection. It may not reveal serious defects and may contain inaccuracies and omissions. It is unlikely to be adequate for a purchaser's purposes and should not be relied upon.

YOU ARE STRONGLY ADVISED TO OBTAIN A FULLER REPORT ON THE PROPERTY.

The Society does not guarantee that the purchase price is reasonable.

Energy Rating Reports

Surveyors will become increasingly familiar with the need to complete Energy Rating Reports on residential property as part of the Government's drive to improve the energy efficiency of our homes and reduce CO_2 emissions. A RDSAP report will automatically form part of the HCR and is already required along with the valuation by some mortgage lenders.

The surveyor completes a simple pro forma form on site which is then downloaded to an energy rating company who produce a report. Essentially these reports are in two parts; first the actual heat losses and CO_2 emissions from the house or flat are calculated using the software system, then the report will include some advice as to how heat losses and CO_2 emissions can be reduced. Normally the recommendations made are listed in order of cost/benefit.

Loft insulation usually comes first with up to 250 mm of fibreglass quilt or similar currently advised for optimum benefit. So if anything less than this is reported an upgrading of loft insulation is usually advised. Then we have draught proofing – lots of benefit for minimal cost. Then perhaps double glazing, solid wall lining, cavity wall insulation, floor insulation and other improvements are suggested.

The effectiveness of the heating system is also included in the analysis so if there is an old, relatively inefficient, boiler an upgrade to a modern condensing boiler may be advised. Surveyors who obtain RDSAP reports on a regular basis will know that the standardised advice will not always be suitable in every case and the implementation may be complicated by planning regulations for listed buildings or in conservation areas. In the case of flats the management arrangements may preclude individual owners changing windows or carrying out insulation work.

Read Chapter 12 and 13

Read Chapter 18 Typical Building Survey Report Example

21

Conservation and the surveyor

> Another giant glass stump better suited to downtown Chicago than the City of London – a monstrous carbuncle on the face of a much loved and elegant friend.
>
> *HRH The Prince of Wales referring to proposed developments adjoining St Pauls, at the RIBA 150th Anniversary Banquet in 1984*

There is now a welcome increase in demand for building surveys undertaken not for prospective buyers, mortgage lenders, landlords or tenants, but those undertaken for existing property owners needing advice on the conservation of their property. Conservation is now a major national and world issue. We must avoid the wasteful use of the world's resources including the fine buildings passed down to us by previous generations. We must be prudent and economical in our use of energy and building materials. I make no apologies for devoting a whole chapter to this issue.

Conservation principles

Surveyors can assist conservation in its widest sense if they aim to further the following objectives when undertaking their day-to-day work:

1. To design and construct buildings with a long lifespan requiring minimal maintenance and capable of adoption to changing needs and the requirements of occupiers.
2. Avoid the wasteful use of materials and energy in the construction process and subsequent life cycle maintenance.
3. To design buildings and modify buildings so as to make them easily repairable with convenient means of access to structural components and services.
4. To plan the maintenance of existing buildings over their life cycle and avoid damage by neglect.
5. To use sympathetic materials and techniques when maintaining existing historic buildings.

Practical conservation techniques are applied in the main to buildings which are of historic or aesthetic importance including most ecclesiastical structures, listed buildings of all types, tithe barns, country houses and even art deco and post-war property where the design or construction is of special interest. Conservation is increasingly important now with the growth of Conservation Areas designated under planning legislation, and Georgian, Victorian and Edwardian terraces are enjoying renewed popularity in many of our towns and cities.

As conservation generally requires a greater degree of maintenance of a continuing nature than would be required for a building of less importance, a great deal of thought and planning should have been

Preparations for a survey

The agencies causing deterioration and subsequent decay in an older building can generally be attributed to the weather, vandalism and misuse, the forces of gravity, chemical attack and biological attack from fungus and insects. People are often responsible for much of the damage.

Before carrying out an inspection, and prior to preparing a building survey, one must therefore consider the original design, its structural advantages and weaknesses, undue wear or damage caused by human agencies and the natural elements and their impact. Sadly unattended older buildings require special attention and security since they were not designed or constructed to resist crowbar or aerosol.

Thankfully in this country we are fortunate in the scarcity of natural disasters such as earthquake or flood and no special precautions are needed against such eventualities but often too scant regard is paid to the effects of gale force winds and snow against which some precautions should have been taken by those responsible for the upkeep of the building.

Before dealing in detail with any of these matters, it must be remembered that during the process of any conservation work to an important building there should have been no interference with any historical evidence which may be in the building or on the site. Before commencing such work the owners should have taken particular care in compiling a fully documented record to include materials and designs used in the construction. Any such information already available should be closely studied and logged by the surveyor before he, or she, begins the survey.

Before commencing any work to a 'special' building, preparing specifications or seeking tenders a full condition survey should therefore be made and a comprehensive report on the structure prepared. This will then indicate how the materials and methods of construction used in the structure have performed in the past and facilitate an evaluation of the likely future performance of that building.

From such a report, in consultation with the owners, the 'degree of intervention' required to carry out the conservation work may be assessed, taking one of the following listed in rising order of cost and complexity:

1. Simple prevention of further deterioration.
2. Preservation in existing condition.
3. Structural consolidation.
4. Restoration of structure, fittings and finishes.
5. Rehabilitation including possible improvement items.
6. Reproduction – imitative or by substitution.
7. Reconstruction in whole or in part.

Before starting the survey it is useful for the surveyor to know in broad terms what level of expenditure and degree of intervention the owner has in mind (most owners will naturally want a Rolls-Royce job for a Morris Minor price). At this point it is also important to establish whether the works, or any part of the works, are to be grant aided from charitable or public funds, since the standards and requirements of the organisation providing the funding will have to be met.

Conservation work generally demands the services of highly skilled and experienced craftsmen (and craftswomen) – stonemasons, for example – who have a long lifetime of experience of traditional methods and materials. In many cases good stonemasons, carpenters, joiners and even plumbers must be artists just as much as tradesmen. The choice of labour for this type of work is particularly vital.

Obviously, it is important that the surveyor does not recommend solutions which are impractical because the skilled trades needed are simply not available in the locality.

To summarise these preliminaries which may be possible for the surveyor to undertake prior to the condition survey:

1. Assess environmental, human and natural agencies causing deterioration.
2. Obtain available documentation including any historical evidence.
3. Establish the degree of intervention the owner has in mind and resources available.
4. Consider the type and availability of the craftsmanship needed.

Techniques, structures and materials

Many older structures to which conservation techniques are applied are less sophisticated and more massive than modern structures which offer equivalent accommodation. Now, in the age of the computer and with the Building Regulations and Codes of Practice offering satisfactory minimum standards, buildings tend to be 'built-down' to these calculated minimum standards and so modern construction often appears to be surprisingly fragile although in fact generally adequate for the forces involved.

The reasons for the more massive material content of the older buildings are that weaker materials were used and 'rule of thumb' was the order of the day, the tendency being to ensure stability by over-designing with extravagant use of material resources.

Another reason for the provision of strength by mass and sheer size was the intended permanence of structures. Short life public buildings were probably unknown in Norman times and during the Middle Ages. Even the sophisticated Romans and Greeks built with permanence in mind and we can still benefit from the results. Compare, for example, Wells and Canterbury Cathedrals with the Roman Catholic Cathedrals of Liverpool and Bristol; which are the more massive and which are likely to have the greater permanence? But in mitigation of modern design, which are likely to be the more maintenance-intensive, original construction defects apart?

The first thoughts of a surveyor on considering the performance of an older building would be directed towards the loadings on the different parts of the structure and, in particular, the foundations. Modern road traffic – increasing in both volume and weight – uses roads which were never designed for the proper transmission of the consequent loadings and the ground vibrations thus caused by such traffic can cause foundation displacement with resultant movements in the upper structure.

Rapid and irregularly applied loads have a far more serious effect on a structure than dead loads or gradually applied loading, but by far the worst damage is caused by regular, rhythmic, repetitive loads which, coupled with the natural resonance of the structure, cause eventual collapse. The tragic loss of the Tacoma Narrows bridge in North-West USA was an example of such a phenomenon and the considerable damage caused to the undercroft and structure of York Minster demonstrates the effect of modern traffic vibrations.

In addition to distortion of the structure caused by the stress and load problems mentioned above, settlement and distortion may have been caused by the action of materials used. These can be broadly divided into defects which occur in the first phase of a building's life – say 25 years from completion – and those which take place at a later date or even have a cumulative effect over the years.

Deterioration or initial shrinkage of materials such as mortar may be responsible for initial deform-

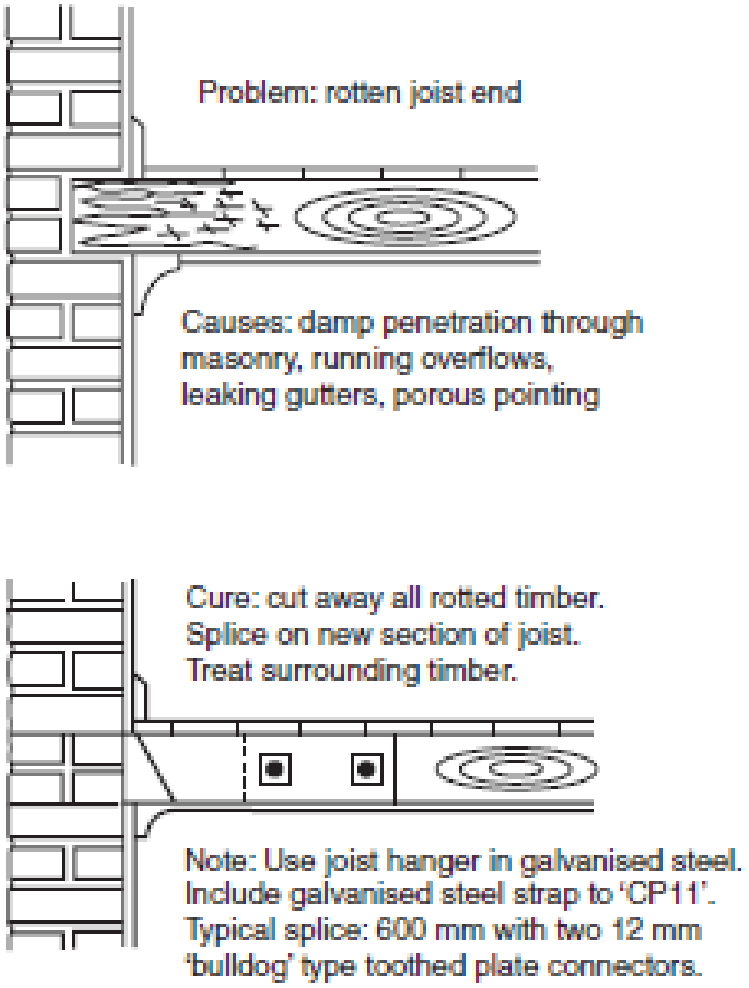
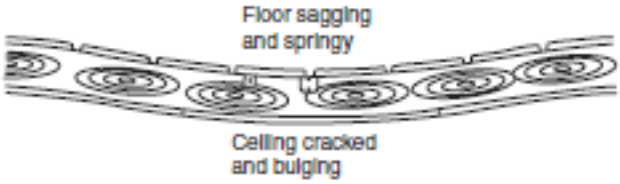
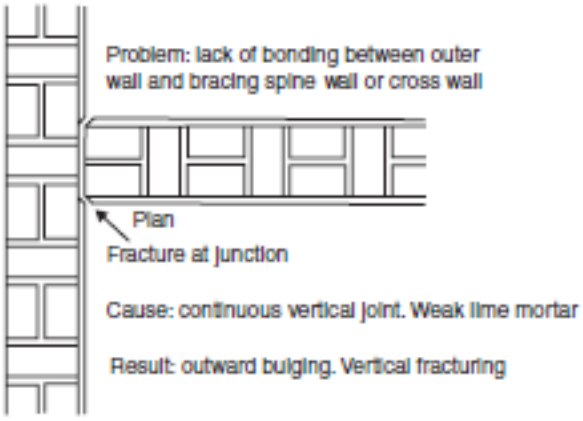


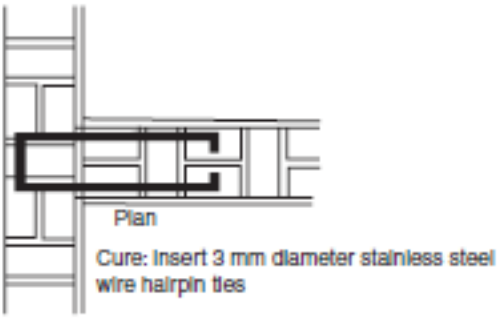
Fig. 21.1 Conserving floors.

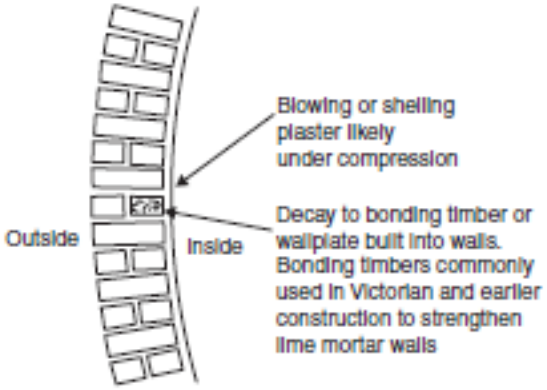


Excessive notching-out of old floor joists. Ideally joists should be drilled. If notching is unavoidable it should be limited to 1/8th the joist depth. Victorian and earlier construction often features undersized joists in any event

Cure: slight deflection – insert new joists/additional joists. Serious deflection – renew whole floor







Bulging wall with timber built into brickwork

Cure: walls seriously out-of-plumb are better rebuilt reusing bricks when these are sound

Fig. 21.2 Conserving walls.

Surveyors as experts

Suitably qualified surveyors are experts. Their field of expertise is building construction and property valuation so they are fitted to provide forensic and expert evidence in a variety of circumstances including formal court hearings and arbitrations.

There has been a growth in this type of work in recent years in the UK, especially in relation to negligence actions involving building defects and valuations. So surveyors will often be instructed to carry out Building Surveys with a view to preparing reports to be used in litigation.

The actual content of the report or proof of evidence will obviously vary greatly from case to case but the opinions should be presented in the form normally used by most surveyors and advocated in this book, that is, first a description of what was seen; then – if appropriate – an indication of what was not

seen; then the conclusions drawn from observation; finally the advice which would normally be given as a consequence of this conclusion.

If the case involves an allegation of negligence against another surveyor then it is invariably necessary to consider in some detail what the circumstances might have been at the time of that surveyor's inspection and to give an opinion as to what a reasonably competent surveyor might have been expected to see, and the conclusions and advice which would have followed, in the circumstances prevailing at the time.

As a general rule it is best to keep the main report or proof short and to add as appendices any plans, sketches, photographs or schedules with reference to these within the main text. Avoid waffle and especially avoid any attempt to indulge in advocacy.