

Master Builders Association of Victoria

Handover Kit



Master

Pre-Handover Checklist

The Pre-Handover Checklist needs to be completed jointly by all of the parties to the contract: the owner (or owners) and the builder (or his or her nominated representative). The purpose of the document is to ensure that all the parties examine the building project both internally and externally together, and that they jointly identify and record all matters which may require completion or rectification.

The clients are thus able to raise issues with the builder on all items that they feel come within the description "incomplete or defective materials or work supplied by the builder under the contract". The builder then has an opportunity to discuss these claims/requests with the owners and to express his or her contrary views whenever he or she is of the opinion that an item is outside the proper scope of that definition.

Any one of the parties who is unable to be present should authorise, in writing, a delegated person to act on his or her behalf. That delegated person must then participate in the joint inspection and sign the lists.

The purpose of the collaborative meeting is, ideally, to agree on the extent of work that the builder must still carry out before achieving completion. If there remain any item or items on which no agreement can be reached, those items should be marked accordingly on the list. All parties should be aware that the Building Commission and its staff, in collaboration with Consumer Affairs Victoria and the relevant building associations, have published an important document. It is titled "Guide to Standards and Tolerances 2007". Reference to this Guide may assist the parties in achieving agreed outcomes about some of the contested items.

The completed checklist must be copied, and each page of both sets signed and dated by all parties before leaving the inspection. As soon as practicable, the builder must provide the clients with a written advice of a realistic completion date for the whole of the agreed work on the list.

The builder acknowledges that he or she is not entitled to request, demand or to receive the final payment - or any part of the final payment - until that work has been satisfactorily completed. The client must acknowledge that upon such satisfactory completion there is no justification for delaying or failing to pay the builder any of the monies then outstanding under the building contract, including any outstanding monies relating to agreed variations.

Clients need to appreciate that any additional items to those on the list prepared and signed at the joint meeting should no longer be considered to be relevant to completion or an impediment to the builder's entitlement to be paid the final claim in full.

However, in so far as these items are defects falling within the builder's responsibility, the builder has a continuing legal and contractual obligation to rectify them as part of the warranty. In the event that a builder fails or refuses to comply with any of these obligations, home-owners have a number of avenues for obtaining advice, assistance and redress. These include the Building Advice and Conciliation service (BACV) of Consumer Affairs Victoria; advisory and complaints services within the Building Commission, as well as the various dispute resolution methods that are more generally available.

MASTER BUILDERS Pre-Handover Checklist

Job Number: _____ Inspection Date: _____

Client Name: _____

Job Address: _____

Clients Signature: _____ Date: _____

Supervisor: _____

Supervisors Signature: _____ Date: _____

Municipality: _____

INTERIOR		Bedroom 1	Bedroom 2	Bedroom 3	Bedroom 4	Lounge	Dining	Kitchen	Family	Toilet	Bathroom	Ensuite	Laundry	Powder	Other
Doors	Sticking														
	Handles														
	Locks														
	Track														
	Stops														
	Frame														
	Paint														
Light	Switches														
	Fittings														
Paint															
Windows	Winders														
	Sliders														
	Sticking														
	Seals														
	Scratches														
	Breaks														
	Robes														
Linen															
Cupboards	Doors														
	Handles														
	Shelves														
	Drawers														

Notes: _____



INTERIOR		Bedroom 1	Bedroom 2	Bedroom 3	Bedroom 4	Lounge	Dining	Kitchen	Family	Toilet	Bathroom	Ensuite	Laundry	Powder	Other
Locks & Latches															
Cabinetry	Bench Tops														
	Surfaces														
	Scratches														
	Doors														
	Drawers														
Taps	Leaking														
Basin, Bath & Toilets	Chips														
	Scratches														
Wall Tiles	Tiles														
	Grout														
	Caulking														
	Bench Tops														
Shower Screens	Operation														
	Scratches														
	Leaking														
Floor Tiles	Tiles														
	Grout														
	Joins														
Other Floor Coverings															

Notes:

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EXTERIOR		
Taps	Leaking	
Waste Pipes	Leaking	
Stairs & Balustrading		
External Steps		
Landing Height		
Paving	Expansion Joints	
	Expansion Foam	
Brickwork	Plumb	
	Jointing	
	Mortar Strength	
	Scaffold Holes	
	Sills	
	Chips	
	Expansion Joints	
	Weep Holes	
	Subfloor Ventilation	
Render	Weepholes Clear	
Roof Tiles	Bedded	
	Pointed	
	Gutters Clean	
Site Clean & Back		
Fill to Slab		
Garage	Remote	
	Floor Clean	

Notes:

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ADDITIONAL NOTES:

A large rectangular area with horizontal dotted lines for writing notes.

TIMBER FLOORS

Five tips you need to know

Congratulations on your choice of timber flooring for you new home

There are some important factors you should understand about high quality Solid Timber Floors, using Hardwood Strip Flooring.

1. Timber is a natural product that behaves differently through the seasons.
Particularly Summer and winter.
2. All timber moves to some extent within itself according to the type of Fixing. 1mm gaps between some boards are not uncommon. Gaps that open during drier months often close during wetter months. The movement may be less in the colder seasons.
3. In choosing timber for your floors, you need to ensure that the floor YOU want is properly specified and stated in the specifications (e.g. species, width, profile, grade, fixing, finish, etc).
4. Timber floors can be sealed using a variety of finishes, each of which Has a different look and a different resistance to wear. These include natural, seal finishes, polishes, waxes, polyurethane's and many other finishes. Make sure the finish YOU want is specified.
5. Heating systems and/or fireplaces can cause localized drying and Consequent movement in timber floors. Similarly, direct sunlight through windows that are not covered can also cause movement. Protect your floor accordingly.

Here's a clause in contracts and specifications –

"The timber strip flooring we supply will be select/medium feature – standard/high feature grade. Installation will be as per manufacturer's instructions and to accepted trade practices. Timber is a natural product and flaws or cracks within and between boards may occur. Such movement is caused by many factors including seasonal changes, sunlight, heating/cooling appliances, applied floor finishes etc. While all care will be taken.....etc."

Look after your solid timber floor – it will repay you with long life!

For further information regarding the use of this important natural resource in floors, contact:

Timber Promotion Council Victoria: (03) 9662 3222

Timber Merchants Association Victoria: (03) 9875 5000

IMPORTANT NOTICE

Protect Your Investment to Avoid Timber FAILURE

FACT 1 Outdoor timbers exposed to temperature changes, water, moisture or humidity, will absorb or lose water. When this happens timber will swell or shrink, with likely twisting, warping or cracking.

FACT 2 If your outdoor timber products are not well protected from water, moisture and temperature changes, you are likely to suffer minor or major timber twisting or distortion, and possibly rotting. This can cause major damage to your property and possible risk to your personal safety.

FACT 3 Timber weatherboards, claddings, lining boards, hand rails and other similar products must not be installed during extreme hot or very wet weather as moisture loss or absorption will be rapid and timber twisting, swelling or shrinkage is likely to occur.



FACT 4 Outdoor timber structures must be correctly fixed or fastened on to timber frames at the correct spacing to avoid likely twisting, cupping, or other distortion causing damage and loss. The structure must also be appropriately maintained.

FACT 5 Incorrect installation methods, inclusive of poor or no clamping, or poor ventilation, may result in timber becoming twisted or distorted, and lead to a shorter service life

FACT 6 Use of incorrect nails or other fixing materials may result in your timber twisting and moving with likely damage and loss. Non galvanised nails will rust and possibly break or fail.








FACT 7 Treated Pine is available kiln dried (KD) after treatment to a moisture content of 12 - 15%. It is recognised by timber experts to be very suitable for most parts of Australia.

Use of wet treated pine should be avoided for structural use as it is not suitable for structural applications.

FACT 8 Timber must be carefully transported, stored and handled to prevent major water exposure, which can cause shrinkage, swelling, cracking and other movement problems. Storage on or close to the ground may cause water absorption and can result in twisting or swelling.



Good Practices to Help Prevent Timber from Excessive Movement and Damage...

-  **Solution 1** Stop timber absorbing water by protecting it with a top quality, water repellent, stain sealer - for example **PROTIM RAINCOAT UV PLUS**, or paint with a premium brand quality paint. Follow the manufacturers instructions carefully regarding application and recoat.
-  **Solution 2** Avoid timber installation during **extreme hot** or **very wet** weather.
-  **Solution 3** Make sure timber is correctly installed in accordance with AS 1684 or the Victorian Timber Framing Manual (available from MBAV stationery points), and in accordance with safe building practices.
-  **Solution 4** Use only hot dipped galvanised nails, bolts, coach screws and other fasteners (stainless steel is also acceptable). Avoid using gun nails unless your supplier guarantees performance.
-  **Solution 5** Demand and use quality Kiln Dried **Treated Pine** - for example **VICTREE PERMAPINE**. Note that good building practices should be used regardless of the choice of material.
-  **Solution 6** To prevent wall cladding from cupping, use only a breather type sarking such as Tyvek or Flamestop building paper.
-  **Solution 7** Protect your timber by covering it with a canvas or heavy tarpaulin when transporting or storing on site. Avoid close contact with wet ground, and store on timber bearers (spaced every metre) to prevent bending. Keep timber at least 100mm above ground level.

• **More Product Solutions Over The Page...**



FOR LONG LIFE OUTDOOR TIMBER PROTECTION PROTIM & VICTREE TIMBER PRODUCTS HAVE A GREAT RECIPE...

RAINCOAT

A water repellent product suitable for treated and untreated timbers. Many colours to choose from and now also available in the new formulation - "UV PLUS" giving maximum UV protection.

BRIGHTENER

A powerful cleaning and brightening agent for reviving faded and badly weathered timber. Recommended prior to staining or painting if timber is badly weathered.

XJ PROTECTOR

An excellent protector and preserver, it is ideal for treated or untreated timber - use in joinery, windows, exterior doors and other above ground structures. Available in clear, green and rich honey brown stains.

RESEAL

For use on treated timber that has been cut or machined exposing untreated timber. Reseal is a water based product that will protect exposed timber.



PROTIM TIMBER CARE PRODUCTS

Protim Solignum is a world leader in timber preservation systems and products. Protim has developed many timber protection products that are highly regarded by leading designers, and technical experts throughout Australia.

CLEANSOTE

A heavy duty creosote based timber preservative for protecting and extending the life of fences, retaining walls, posts, poles & other exterior timbers.

C N TIMBER OIL

A general use heavy duty preservative for use in many outdoor applications.

C N EMULSION

This excellent preservative is ideal for above and below ground use. A heavy "jelly" like substance applied to exposed timber, particularly in holes or rebates that may trap water.

BLUE 7 GEL

A powerful diffusing preservative for treatment of decayed timber in wet areas.

For Details of Your Nearest Stockist

Contact our National Distributor

Thomson White Australia

Phone: **03 9791 8211** (in Vic)

OR FREECALL

1800 651 631

ESSENTIAL INFORMATION ON STRUCTURAL GRADE TREATED VICTREE PERMAPINE

- **Beecham-Wright** produce high grade kiln dried treated pine in accordance with Australian Standard AS 1604, giving the timber high resistance to rotting and insect attack. Ongoing CSIRO testing has shown treated pine to out-perform most of Australia's highly durable timbers, giving builders and renovators one of the world's most reliable and long lasting building materials
- **Victree Permapine** is also kiln dried after treatment to 15% or less moisture content making it very stable and giving it greater strength and reliability. It is available in a large range of sizes, structurally graded and stamped, and can be supplied in either dressed or fine sawn appearances.



**FOR OUR INFORMATION PACK, OR DETAILS OF YOUR
LOCAL STOCKIST PHONE FREECALL 1800 065 073**

VICTREE TIMBER PRODUCTS



VICTREE TIMBER PRODUCTS

Foundation Maintenance and Footing Performance: A Homeowner's Guide



CSIRO

BTF 18
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
I	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites with only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes
H	Highly reactive clay sites, which can experience high ground movement from moisture changes
E	Extremely reactive sites, which can experience extreme ground movement from moisture changes
A to P	Filled sites
P	Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject

Tree root growth

Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation

Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpend).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

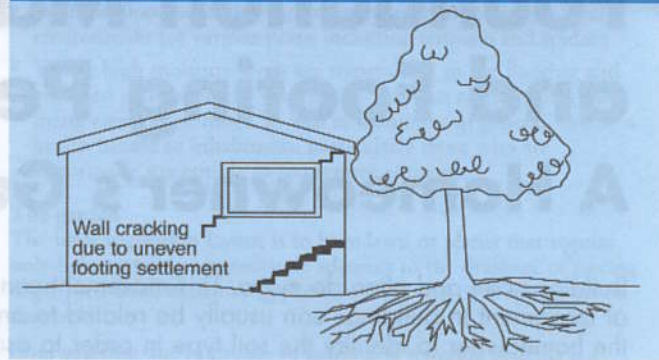
Seasonal swelling/shrinkage in clay

Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip

Trees can cause shrinkage and damage



As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots

In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself

Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures

Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures

Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures

Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem.

Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.

- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing

Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage

In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

Protection of the building perimeter

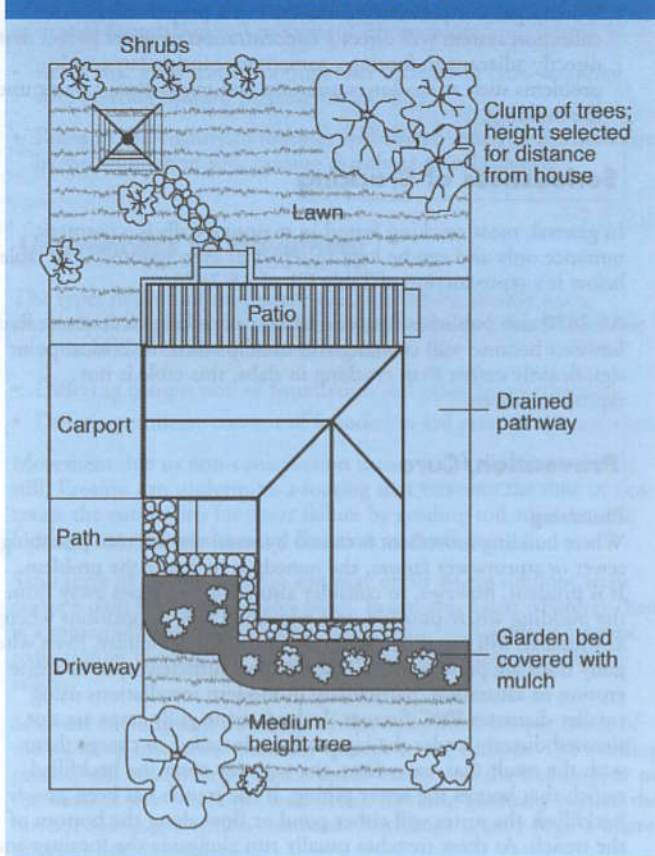
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted	15–25 mm but also depend on number of cracks	4

Gardens for a reactive site



should extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

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A guide to maintaining your
New Building Project



**Master
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Dear Home Owner

Congratulations on taking possession of your new home or renovation/extension. Having chosen a Master Builder to bring your building project to completion, you are now at the point where much of the responsibility for keeping your home in the best possible shape will rest with you. This Kit is designed to assist you in this task.



SECTION 1:

The Building Process and its Product

Homes, like cars, need to be maintained. Cars will fail sooner and will deteriorate more quickly if you as the owner do the wrong thing. Car manufacturers have a significant advantage in keeping consumers informed about how to maintain their vehicles. They are engineered and assembled in a factory. Building projects on the other hand are almost always unique in one respect or another and are assembled on site.

This Master Builders' Handover Kit is general in its comments. Because circumstances vary, ie the materials used and the location of the building project as well as climatic variations from one building project to the next, you will also require specific advice to take into account your own unique circumstances.

The Master Builders Association strongly recommends that you read the contents of this handbook and use it as a resource in developing and implementing your own maintenance plan.

SECTION 2:

Document Check List

You should keep all the documentation relevant to your building project in one place. This handbook has been designed to enable you to do this. We recommend that you include at least the following important documents -

Your signed copy of the building contract; including all drawings and other documents forming part of the agreement and signed by both parties.

All required permits (in particular the Building Permit and, where it was required, also the Planning Permit) including all stamped drawings and other documents and also all amendments made to these (if any).

Records of all changes to any of the plans and specifications that had formed part of the permit and/or contract.

Contact list of key trades.

Warranties and certificates, such as –

- Warranty insurance policy
- Certificate of Occupancy or of Final Inspection (as the case may be)
- Termite treatment
- Plumbing
- Electrical
- Glazing
- Heating/hot water & appliances
- The "Guide to Home Owners on Foundation & Footing" published by the CSIRO
- The "Guide to Standards and Tolerances" published by the Building Commission
- Inspection Check List



SECTION 3:

Final Inspection

Either immediately before handover, or at the same time, your builder should have advised you of your opportunity/ obligation to hold a joint inspection with the builder and prepare a list of all matters you believe to require attention in order to achieve completion. This may include items which you believe to be defective.

To assist you and your builder in the preparation of this list, an Inspection Check List form is included in this Handover Kit. You - or your representative - and the builder should complete this form on a room by room basis.

The Building Commission (which is a State Government agency) has developed a useful guide for the industry and its clients in regard to acceptable standards of building called Guide to Standards and Tolerances. You may check on any updates on the Building Commission's website -

<http://www.buildingcommission.com.au>.

When you and your builder have finished compiling your list of items, both parties need to sign the document. The builder is then obliged to carry out and complete works on these agreed items. The completion of these works may be dependent upon the availability of the relevant materials, products or finishes. The builder will advise you of the time when he/she expects these materials to become available.

This inspection and notification is your opportunity to raise these issues prior to completion.

On completion of work on the agreed items on the list, the builder is immediately entitled to full payment of the amount shown on the final claim. All further issues are to be dealt with under the warranty processes.

The builder's warranties in the contract oblige him or her to rectify all defective materials and all defective workmanship provided by him or her under the contract, as well as all damage that may have been caused by such defective materials or workmanship, at no cost to the owner.

It is important to be aware that the builder's post-completion warranties do not apply in some circumstances, including the following:

- where the alleged defect is within permissible tolerances, as it does not constitute a defect;
- where the alleged defect is, in fact, normal wear and tear;
- where the alleged defect consists of defective materials or workmanship supplied and/or installed by others;
- where some defect or damage is not due to defective materials or workmanship supplied by the builder under the contract but to some other cause, such as:
- acts and omissions of the owner, the occupier and of all persons other than the builder (and the builder's employees, suppliers or subcontractors);
- events outside or beyond the builder's control or responsibility (such as fire, flood, earthquake, impact by objects etc);
- work carried out during the warranty period by persons other than the builder (and the builder's employees, suppliers or subcontractors).

Please note that the builder's warranty will be voided altogether in respect of all work and all materials, finishes, components, systems, equipment etc. affected by any work carried out by trades - or other persons not under the builder's control.



SECTION 4:

Dispute Resolution

The quickest, simplest and most cost effective way to resolve quality issues is through discussing the matter with your builder and agreeing on an outcome which is satisfactory to both parties.

We suggest that the steps should be as follows:

Agree issues –

- Agree the matters that need attention.
- Agree mutually satisfactory outcomes.
- Agree time frame for achieving the outcomes.

You may contact Consumer Affairs Victoria if you feel the need for external assistance. Consumer Affairs can be contacted on 1300 558 181.

Should you feel the conduct of the builder warrants investigation by the Master Builders Association, please send a letter of complaint addressed to The Legal Manager, Master Builders Association of Victoria, GPO Box 5442D, East Melbourne Vic 3002.

SECTION 5:

Home Owner's Duties, Obligations and Responsibilities

Defects liability

Some building contracts nominate a defects liability period. This is intended to ensure that any defective work observed and reported during the early days following the occupation of the building can be rectified with due speed.

Damage incurred after handover will not be repaired by the builder unless it was caused by –

- some pre-existing defect in the materials or workmanship provided by the builder as part of the contract work; or
- some act or omission by the builder after handover.

Product warranties in this Kit

This Kit should include warranty certificates for all equipment purchased and/or installed in your home by the builder under his or her contract with you. If you have purchased any equipment from, or had any equipment installed by some other persons, you should also keep their receipts and warranties here.

It can be frustrating for all parties when consumers ring for service without a full understanding of the service available. Sometimes your builder is not necessarily the most appropriate first port of call. For example, queries on the operation of your new oven are best answered by the supplier.

Ongoing maintenance

Your home, as your car, needs to be maintained on a regular basis. Without basic care your home can deteriorate, causing serious damage, which could be costly to fix. Your warranties may not cover all repairs, especially if the damage is caused by failure to provide proper maintenance.

The law requires that certain types of work are only carried out by appropriately qualified and licensed trade persons. These include all electrical work, all gas, plumbing, refrigeration and roofing work and all termite treatment work. This is not a full list of such work.

You must also consider the safety of all persons living in or entering your home, including all those carrying out repair or maintenance work. Please check the various appliances installed or otherwise used in your new home and compile a list of regular maintenance you need to carry out, including the frequency of activities.



SECTION 6:

Some Common Maintenance Issues

Stormwater drainage: The gutters, downpipes and drains collect and remove water from the roof and from the paved surfaces of your home. They need to be inspected to ensure they are working correctly. The system needs to fall away from your home. The systems of water removal may include drainage pits, silt or oil traps and other items.

You must always ensure that water cannot pool under, nearby or against your home or it will cause movement, distortion and other damage to structural elements.

You must ensure that any hard surfaces – such as paving, pathways etc - which you may install in the vicinity of any walls, are designed and constructed with careful attention to avoiding potential drainage and water penetration problems. You must also avoid overwatering the ground near any walls.

Electrical: Your electrical installation includes safety switches to protect users and the public. When you lose power you need to turn off all appliances before you reset the switch on your switchboard. The causes of outages are often faulty or defective appliances on the power circuit. These appliances need to be checked by a licensed electrician or, where practicable, returned to the place of purchase.

All your smoke alarm backup batteries also need to be checked on a regular basis and replaced whenever they are ineffective.

Floor coverings: The proper protection of some floor coverings, such as timber, vinyl and cork, requires them to be sealed, in addition to regular cleaning.

Direct sunlight, even through glass, can also damage some floors and floor finishes, so make sure you read manufacturers' guides and provide the required protection to the floor by curtains, blinds or by some other appropriate means.

Grey water: Make sure you read the systems manual for grey water systems so that you understand operating and servicing requirements.

Rainwater toilet systems: Rainwater toilet systems depend on water collected from your roof and its drainage system. You need to understand the operation of this system, especially during low rain fall periods. Please read your rainwater toilet system manual carefully.

Heating and cooling: Systems need regular servicing by licensed tradespersons to make sure they work effectively and efficiently. Servicing usually includes cleaning of filters, refrigerant gas and cleansing of water cooled units.

Hot water and solar systems: These also require regular periodic servicing to make sure they are working properly. Manufacturers' recommendations need to be understood for frost protection of solar panels and sacrificial anodes in the water storage.

Painting: Paints used on external surfaces will deteriorate with time and will need attention in accordance with the manufacturers' recommendations. How long your paint lasts is dependent on many factors, including the colour selected, as well as the exposure of the particular painted surface to weather and to other environmental influences.

The maintenance of painted surfaces in a good condition is essential to the protection of the underlying materials. For example, well-maintained paintwork on timber external walls will reduce the likelihood of rot occurring in the timber.

Internal paints tend to last for a lot longer, but exactly how long is also dependent on the surroundings created by the lifestyle of occupants. Among other factors, any excessive moisture, smoke, direct sunlight and the use of certain cleaning agents will reduce the lifespan of a painted surface.

Swimming pools, fences and gates: The servicing needs of pools are dependent on the system selected, the usage, weather conditions and the time of year. Generally speaking summer (warmer months) requires higher levels of maintenance to prevent algae growth.

You need to be always mindful of the hazard that swimming pools represent to the security and safety of people, and especially of all children. You have express legal obligations concerning the control of access, by prescribed types of fences and gates. Your obligations include ensuring that those fences and gates are working properly at all times.

Termites: Your home may be or become subject to termite infestation. We strongly recommend regular inspections by experts to ensure that any occurrence or recurrence of termites is noticed early and is dealt with promptly, so that any damage to your home is minimised or avoided. Tell tale signs of termite infestation include the appearance of numerous round holes, 2-3mm diameter, with abundant, loose and gritty frass (borer dust), which feels like fine table salt.

There are many approved termite protection systems, including barrier protection, chemical sprays and cap systems for stumps. If one or more of these have already been provided for your home, you need to read the specialist advice provided by the provider/s of your termite protection system/s.

Do not store any wood or paper-based products adjacent to walls or under the floor of your home. These can attract as well as conceal termites.

Trees and gardens: Your landscaping and gardens can affect your home if drainage issues are left unresolved. Before making any changes to your external areas, you should discuss the drainage implications with a qualified civil engineer, landscape architect, landscape gardener or plumber. Damage to your home can be minimised and unnecessary repairs avoided by taking their advice.

Trees and some other plants are also common causes of damage. First, by absorbing water, they change the moisture content of the surrounding soil. If a tree or shrub is too close to a building, its spreading roots will affect the soil supporting the building and damage the foundations. Secondly, such adjacent roots can also affect the moisture content of porous building materials such as concrete and brick.

Automatic watering systems need to be checked regularly to ensure no leakage from the sprays or drippers and that water is directed to the garden or lawn areas. Sprinklers that spray on your home need to be redirected to ensure your home is not subject to water entry through weep holes, window sills, doors or other points of entry.

This Kit includes a copy of the CSIRO "Guide to Home Owners on Foundation & Footing". This document provides assistance to homeowners on identifying causes of movement in a building. It will provide you with information on different types of soil and it illustrates the damage that buildings can suffer when foundation soils are affected by changes in moisture content. It also gives advice on how to avoid these problems.

Water (potable supply) should always be used sensibly and only after checking with your local authority for restrictions on its usage.



SECTION 7:

A Place to Sign

Customer: _____
 Address: _____
 Job No: _____
 Municipality: _____
 Supervisor: _____

ITEM CHECK (please tick) ✓

Section 1

- Pre-Handover Checklist
- Handover letter

Section 2

- Certificate of warranty insurance
- Certificate of occupancy/completion
- Certificate for termite treatment
- Certificates for all plumbing and various trades
- Certificate of electrical safety
- Glazing certificate
- Heating, hot water & appliances
- Timber floor management guidelines
- Homeowner's termite manual
- CSIRO Guide to Home Owners on Foundation & Footing
- Warranty cards for supplied items
- Other notes from suppliers an subcontractors
- Colour selections

Section 3

- Information for home owners

Section 4 (place to sign with duplicate)

Owner 1 _____ Date _____
 Owner 2 _____ Date _____

Builder _____ Date _____
 (or builder's representative)

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HOME OWNER'S GUIDE FOR

Termite Management

This guide has been produced
by Master Builders Australia in the
interests of consumer information and education

Sixth Edition - August 2007



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Table of Contents



Your New Home Termite Management.....	2
General Requirements for Termite Management.....	3
Termite Shielding for Suspended Floors.....	5
Concrete Slabs as a Barrier.....	6
Stainless Steel Mesh Management System.....	7
Graded Stone Management System.....	8
Chemical Soil Management System.....	9
- Hand Spraying to Under Slab Area.....	9
- Hand Spraying Under Suspended Floors.....	10
- Perimeter Treatments.....	10
- Reticulation System.....	11
Termite Resistant Materials.....	12

This guide has been produced by Master Builders Australia in the interests of consumer information and education.

Each State and Territory based Master Builders Association has contributed to and endorsed this guide. Special thanks are given to the Queensland Master Builders Association for its assistance with the development of this guide.

The information contained within has been prepared in good faith and is intended for use by new home buyers to understand the options now available for termite management in new buildings. Home owners are advised to check with the manufacturers of each system for detailed information on limitations and ongoing maintenance.

Your New Home



TERMITE MANAGEMENT

Your new home is one of the most significant investments you will make during your lifetime.

Just as you would like to see any investment protected, your new home requires management against termite attack. Many millions of dollars are spent each year by home owners rectifying damage caused by subterranean termites (termites forming nests in the ground).

Termites have existed for approximately 100 million years. In Australia there are about 30 species which have been shown to create some significant damage to buildings. Although they are commonly referred to as white ants, termites are, in fact, closely related to the cockroach.

Termites will eat timber and most materials containing cellulose - their principal food - and this could include the contents of buildings such as built-in-cupboards, skirting boards, furniture, some carpets, fabrics, packing cases and other similar materials.

A termite attack is usually initiated from a nest located in the ground outside the building. In some cases, a nest can be located directly under the building from where termites may attack through any penetrations or openings in the slab or around service entry points such as plumbing or electrical pipes.

Damage from termite attack can be reduced to a minimum, if not eliminated by the use of some proven methods and regular maintenance by you, the home owner.

All new buildings (including extensions) in Australia are now built in accordance with the Building Code of Australia (BCA). The BCA requires all Primary Building Elements (PBEs) to be either managed against attack by termites or built with termite resistant materials. It should be noted that the PBEs are only structural elements of the building, including the roof, ceiling, floor, stairway or ramp and wall framing including bracing.

Your builder will use one, or a combination, of the methods described in the Australian Standard AS 3660.1 - 1995 - Protection of New Buildings from Subterranean Termites to provide a management system for the structural members (PBEs) of your home. Alternatively, the builder may use termite resistant materials as called up in the Building Code of Australia (BCA).

This guide will enable you to understand each of the methods available, the warranties available and most importantly, the ongoing obligations for you, as the home owner, which will ensure a reduced risk of termite attack for the lifetime of the building. More detailed information is available from the Australian Standard AS3660.1 - 1995.

When making any decision about termite control or in assessing the system proposed by your builder, you should consider the following guidelines:

- The cost effectiveness of the barrier system over the life of the building
- The life expectancy and effectiveness of the barrier
- Any warranty or insurance cover supporting the installation
- The requirements for maintenance and any retreatments necessary
- The effect of the system on the environment and occupants
- Any effect the choice of system will have on the future resale value of your home

Termite management will be your responsibility!



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General Requirements for Termite Management



The Building Code of Australia and the Australian Standard AS 3660.1 - 1995 provide for the minimum level of treatment for buildings and therefore it is important that home owners are aware of the fundamental requirements for termite control.

Where new buildings are to be constructed in areas of higher termite risks, additional methods may need to be used to provide an acceptable level of treatment. (*Local Authorities, Pest Controllers, Government Departments and building certifiers would be aware of most areas with high levels of termite risk.*)

SITE PREPARATION

Careful attention should be given to the preparation of the site to help reduce the risk of attack by termites. An inspection of the area around the building site should be carried out before building starts and any termite nests eliminated, particularly in rural areas and areas north of the Tropic of Capricorn. All timber debris, tree roots and stumps - termite food - need to be removed from the site.

Most termites like dark, moist conditions and areas with fungal growth. Careful attention needs to be given to any areas around or under the building which might allow moisture to accumulate. Site drainage and sub-floor ventilation where applicable is extremely important and home owners should ensure that these areas are not hindered in any way.

Additions to Buildings

Termites can use various ways to enter a building. Any additions to homes after completion also need to provide a continuation of barriers. Structures such as pergolas, decks, carports, verandahs and steps may -allow undetected entry of termites into the main building.

The fundamental concept of a termite management system relies upon the provision of a complete and continuous barrier to bring the termites to a position where they can be detected by regular inspection. Where different forms of construction are in use, different methods of termite barriers may need to be used.

COMPLIANCE AND APPROVALS

Most home warranty schemes, whether Government or privately operated, will require the builder to comply with the legislative requirements of the Building Code of Australia. As mentioned before, this will mean using one or more of the methods in the Australian Standard, other approved/certified methods, or building the PBE out of termite resistant materials.

It is important to understand that if termite resistant materials are used for the loadbearing elements with no other form of termite control, the non-loadbearing elements and the contents of the home may still be susceptible to termite attack.

Local Authorities have a discretion as to whether or not some of the methods used are acceptable. Some methods such as termite shields or 'ant caps' do not require prior Council approval before they can be used, however, all methods will need to be included in the plans for Council building approval.

Because there are now a range of different methods to choose from for termite management, decisions will need to be made by you, the home owner, in conjunction with the builder as to the method(s) used.

(Continued over page ...)



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General Requirements for Termite Management (Continued)



This guide is part of the process of consultation between you, (the home owner), the builder, the pest controller and the designer (if applicable).

COST OF SYSTEMS

The cost of each method will vary depending upon the management system provided and the durability of the products. Whilst most builders will recommend to you the more cost effective option, you will need to be aware of the long term features of the systems and the obligations placed upon you as a home owner for the maintenance of the system.

You should consult with your builder for more accurate information in your area.

NOTICES AND CERTIFICATES

There is a requirement of the BCA for your builder to place a durable notice on the home in a prominent location such as the meter box. This is also recommended when using termite resistant material. This will usually be done by the builder prior to handing over possession of the building.

This notice will describe the particular termite management system used, the date of installation, the importance of regular inspections and the need for regular maintenance to be carried out on the home. Where a chemical barrier is to be used, the notice will also indicate the life expectancy of the chemical used.

Some states will require a form of certificate to be provided for some of the barrier systems prior to the completion of the home as evidence that the system was installed in accordance with the manufacturer's requirements and/or the Australian Standard. Not all forms of barrier require or need a certificate.

REGULAR INSPECTIONS

Regardless of the system used, it is extremely important that regular inspections be carried out as part of your ongoing maintenance of the home.

Inspections by competently trained persons will ensure that the barriers have not been breached by termites. For some of the methods, annual inspections will be a mandatory requirement of the warranty conditions. However, inspections should be carried out at least every 12 months and even more frequently (3-6 months) in high risk areas.

All barriers can be bridged by building garden beds, attaching other structures to the building or by placing timber up against the home.

The home owner will be responsible for ensuring annual inspections of the home are carried out by trained persons.

It is strongly recommended that home owners retain a copy of the written report of every inspection and re-treatment. **Unless you, the home owner, can show that regular inspections have been carried out, then any rectification will be your responsibility.**



Termite Shielding for Suspended Floors



Timber floors have traditionally relied upon ant caps and termite shields to provide a termite detection system to the building. Timber floors are still able to be used economically and will continue to provide design solutions for different sites.

In many parts of Australia, timber floors are popular and this form of construction uses foundation walls over strip footings to provide the required clearance above the ground. The fact that the floor is above the ground will not prevent termites from attacking any timbers. Termite shields are used to provide a means of detecting termite activity as they move up the subfloor walls and posts.

Termite shields can be made from a number of different materials which are considered durable and able to be installed in such a way that termites are forced out into the open for detection. These shields will not prevent termites getting into a building, however **regular inspections** will detect the termites trying to get around the shielding.

Termite shields are usually placed on top of stumps, piers and foundation walls at a level directly below the lowest floor timbers.

An important feature with timber floors and termite management is the clearance between the ground and the lowest floor timbers. Adequate clearance should be maintained to allow trained inspectors to gain access to the sub-floor area and carry out regular inspections of the termite shields and sub-floor walls.

Where reasonable access cannot be provided, a complete chemical or physical barrier should be installed in the subfloor area.

In some bushfire prone areas, the requirement for protection from sparks and embers may conflict with the requirements for termite control. You should discuss details with your builder or designer to ensure that ventilation openings are sufficient and physical barriers are not bridged.

WARRANTY

There is no product warranty for termite strip shielding when used in suspended timber floor construction unless the manufacturer or installer specifically specify their own warranty.

The home warranty insurance schemes in some States may cover home owners for termite attack within the statutory warranty period providing home owners can establish that regular inspections and/or ongoing maintenance was carried out.

OWNER'S OBLIGATIONS

Home owners should ensure that conditions under elevated floors are kept dry with adequate cross ventilation maintained. The ground surface needs to be kept graded to ensure moisture does not pond or accumulate in any area. It is important not to stack timber under the building or up against the subfloor walls as this can allow undetected entry.

Home owners may choose to use one of the other physical or chemical barriers as an additional form of termite management.

Regular inspections should be carried out by trained persons such as a licensed pest controller or accredited pest inspector. A record of these inspections should be kept by the home owner as proof of this on-going maintenance.



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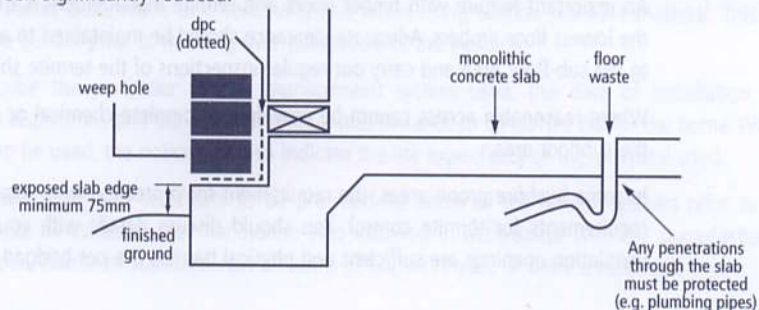
Concrete Slabs as a Barrier

For concrete slabs to form part of a termite barrier, the slabs need to be constructed in accordance with the Australian Standard AS3600 - Concrete Structures or AS 2870 - Residential Slabs and Footings. The majority of slabs designed by structural engineers will comply with the latter requirements.

Termite entry may occur at the slab edge, through cracks, joints and imperfections in the concrete or around service pipes through the slab. Particular attention should be given to the control of shrinkage cracking by the engineer when designing the slab.

The termite standard now allows the use of an exposed slab edge as a form of perimeter treatment. This exposed slab edge must show a minimum of 75mm of concrete. This exposed edge will not stop the termites from gaining access into the building, however the termite mud tunnels will be noticed with regular inspection after which appropriate action can be taken to destroy the nest. The potential for termites to build these mud tunnels up the side of the exposed slab increases, as the climate becomes more tropical.

From the limited evidence available, it appears the majority of infestations occur at the perimeter of the building. As a result of the introduction of Australian Standards such as AS2870 and AS3600, the likelihood of major cracking has been significantly reduced.



Because most concrete slabs have some penetrations through them, these must be protected by using one of the other approved materials or methods of management. Particular attention should be given to any penetrations or control joints, since access to these areas is extremely difficult later.

WARRANTY

There is no product warranty for concrete slabs when used as part of the termite barrier. Builders will have complied with the standard and the Building Code of Australia providing the slab is designed in accordance with AS 2870.

The home warranty insurance schemes in some States may cover home owners for termite attack within the statutory period, providing home owners can establish that regular inspections and/or ongoing maintenance was carried out.

OWNER'S OBLIGATIONS

Home owners should ensure that conditions around the home are kept dry and garden beds, paving, turf or any covering does not bridge or cover the exposed edge and that a minimum of 75mm of exposed edge is maintained. If the edge is to be covered then another form of perimeter management system should be installed.

Regular inspections must be carried out by trained persons.



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Stainless Steel Mesh Management System



Stainless steel mesh systems are made from finely woven, marine grade stainless steel mesh and are placed either fully under a slab or alternatively, used around penetrations and the perimeter of slabs.

The use of stainless steel mesh as a physical management system will not kill the termites, but it will force them out into the open for detection.

The grid pattern of the mesh is fine enough to not allow termites through and is tough enough to prevent them from chewing through it. Being marine grade stainless steel, it should not be affected by the corrosive nature of concrete and some ground conditions.

A strip of marine grade stainless steel mesh is fixed to the perimeter wall cavities and service penetrations in such a way as to prevent termites coming up through the cavity. This becomes a permanent barrier and works in much the same way that an insect screen does. It is fitted by trained installers during the early construction of the building, or as specified by the manufacturer.

The mesh is tightly locked into place during the manufacturing process by intersecting wires that can't be tampered with, thus ensuring lifetime effectiveness. It has been proven by CSIRO not to let even the smallest termite through.

The mesh's flexibility means that it can be formed to all the contours and irregularities often found in a construction environment and minimises the possibility of termites finding a passageway, as might happen with more rigid materials. It is held in place by a specially formulated bonding cement and will not delaminate. It can be jointed without solders, sealants or glues, giving a permanent termite resistant seam.

Because of the nature of termites, the potential points of entry are usually out of sight. It is uncommon for you to actually see the stainless steel mesh after installation. This is why it is important for the mesh to be installed in accordance with the manufacturer's specifications and recommendations.

This System can be adapted to all types of building construction.

WARRANTY

Manufacturers should be approached to obtain full details of warranties provided.

Where termite attack occurs within the statutory warranty period, the various home warranty schemes in some States may cover home owners for termite attack providing home owners can establish that regular inspections and/or ongoing maintenance was carried out.

OWNER'S OBLIGATIONS

Regular inspections are highly recommended but not mandatory. The general requirements for termite management should be followed for all buildings.

- Hand spraying to Under Slab Area

Hand spraying of chemicals to the under slab area is carried out prior to the placing of the concrete slab. This is a convenient method for buildings to use because the pest control must occur before the slab is poured and the under slab area is exposed to the atmosphere of the under slab to be dry.

Graded Stone Management System



Graded stone must conform to particular performance criteria as set out in the termite standard. Granite stone from specific quarries provides the performance characteristics required.

The graded stone termite barrier system works on the principle that the particles, which range in size from 1.7mm to 2.4mm and have particular shape characteristics, are placed so as to block termite access into the building.

The termites cannot find a path through the layer of stone as the particles are too hard for them to eat and too heavy to move out of the way, while the voids between the particles are too small for the termites to pass through.

Current specifications are available for all areas in Southern Australia. The larger termites found in the northern areas require a different blend of particle sizes to block their movement. Builders and local authorities should check on the availability of approved products in tropical areas. Tropical installation methods are similar to subtropical and temperate designs.

The manufacturers of the graded granite recommend the use of a full layer under slabs, however treatment of the penetrations and perimeter in conjunction with the correctly designed slab (AS 2870) is available as a cheaper option.

Particular attention must be given to the installation of the management system to prevent contamination of the graded stone by other materials such as wood or clay during the installation.

Perimeter management with graded stone can be achieved in a number of different ways. The final cost for termite management using graded stone will depend upon the chosen installation method selected.

WARRANTY

Manufacturers should be approached to obtain full details of warranties provided.

Where termite attack occurs within the statutory warranty period, the various home warranty schemes in some States may cover home owners for termite attack providing home owners can establish that regular inspections and/or ongoing maintenance was carried out.

OWNER'S OBLIGATIONS

Regular inspections are highly recommended but not mandatory. The general requirements for termite management should be followed for all buildings.

OWNER'S OBLIGATIONS

Home owners should ensure that conditions around the home and land are maintained and that a minimum of 100mm of gravel is maintained. If the edge is to be covered with a concrete or other material, a termite management system should be installed.

Regular inspections must be carried out by trained persons.



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Chemical Soil Management System



Chemical systems can be used to treat both the under slab area and the external perimeter of the building. The chemicals will prevent the termites from gaining access through the chemical into the building, allowing them to be detected with regular inspection.

Chemicals are available in a number of forms and require strict procedures for the application and maintenance of the barriers. Concerns about the possibility of environmental contamination has led to the banning of the previous chemical which provided long term treatment. Any new chemical will be unlikely to provide such long-term durability and some form of re-application may be necessary.

All chemicals must be approved by the National Registration Authority for Agricultural and Veterinary Chemicals (NRA - National Registration Authority). The labels for such chemicals are approved by the NRA and stipulate the correct usage of the chemical.

The preparation of the site is important when applying chemicals to ensure the best distribution and penetration for the chemical. Particular attention should be given to areas behind retaining walls to ensure a complete vertical barrier is provided against the building.

There are a number of ways by which approved chemicals may be applied to the under slab area, the area under a suspended floor and to the perimeter of a building. These are:

- Hand spraying by a licensed pest controller to the under slab area,
- Hand spraying by a licensed pest controller under a suspended floor area,
- Rod injection or trenching to the perimeter of the building, by a licensed pest controller,
- Installation of an approved reticulation system under the slab by a suitably licensed installer.

The installation of a chemical barrier does not negate the need for regular inspections and in fact due to the lower durability of the new chemicals, most of the providers of chemical barriers will insist on annual inspection. Areas north of the Tropic of Capricorn will also require more periodic inspections due to the nature of the voracious termites present in tropical areas.

Because other chemicals are being tested all the time, home owners should obtain information from the builder or licensed pest controller about the durability of the chemical, the frequency of any re-treatments and any warranty conditions which may apply.

Several chemicals have been approved by the NRA and should be used strictly in accordance with the conditions noted on the label of each container. These conditions may vary in each State, depending upon the soil types and other climatic influences. Pest control operators must only use these products where the particular use is stipulated on the label.

Home warranty insurance schemes can vary from State to State and product warranties can vary from pest controller to pest controller. Home owners should check the information before using chemicals.

The following sets out the important features and owner's obligations for each method of chemical treatment:

- Hand spraying to Under Slab Area

Hand spraying of chemicals to the under slab area is carried out prior to the placing of the concrete slab. This is a convenient method for builders to use, however the pest controller must ensure that the strict health and safety conditions are followed in relation to the installation of the vapour barrier to the slab.

(Continued over page ...)



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Chemical Soil Management System (Continued)



All chemicals have a limited life expectancy which can vary. All limitations are specified on the product labels. The current method of providing retreatment of the area under the slab after these periods of time when the chemical has degraded, is to drill through the slab and reinject the chemical. This retreatment method can be inconvenient and expensive and would always be required when termite infestation occurs. An alternative to this system is a chemical reticulation system, which allows the chemical to be pumped under the slab without drilling.

WARRANTY

Providing the chemical used is approved by the NRA and applied strictly in accordance with the label conditions, the home warranty schemes in each State may cover home owners for termite attack within the statutory warranty period providing home owners can establish that regular inspections and/or ongoing maintenance was carried out. After the statutory warranty period, the home owner will be responsible for rectifying any damage by termites, in the absence of any other warranty cover.

OWNER'S OBLIGATIONS

Home owners will be responsible for the ongoing maintenance of the building and to ensure regular inspections are carried out. The home owner will also be responsible for the ongoing retreatment of the chemical barrier under the slab.

- Hand Spraying Under Suspended Floors

This method would be used only where there is difficult access to the area under a suspended floor, including clearances less than 400mm.

WARRANTY

Any warranty for suspended floors will rely upon regular inspections by trained persons and since it may be difficult to gain access to inspect some areas, the continuation of the warranty may be difficult. A warranty may be available for this situation, however this is only to respray the area and eradicate the termites, not to repair the damage caused. You should check with your pest controller or builder first about warranties for chemical barriers.

OWNER'S OBLIGATIONS

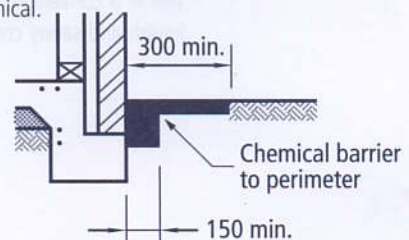
Regular inspections will be required and access maintained to the under floor area.

- Perimeter Treatments

The perimeter treatment of the building can be achieved using approved chemicals either by injection with rod equipment at 300mm centres or by digging a trench 150mm wide and down to the top of the footing and treating the trench and the backfill material with the chemical.

A horizontal barrier of 300mm wide is also required at the surface level.

This treatment is usually done by the pest controller just before the house is handed over to the owner.



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Chemical Soil Management System (Continued)



Where concrete driveways and paths abut the building, the same consideration for an under slab treatment is required; i.e., **the retreatment of the perimeter system.**

It is important not to disturb the chemical treatment by installing gardens, paths or introducing other untreated material such as soil or turf. Any disturbance of the perimeter treatment will necessitate a retreatment of the chemical treatment. The use of chemicals for perimeter treatments rely heavily on the home owner to maintain the continuity of the barrier.

WARRANTY

Pest controllers are unlikely to provide a warranty for any long period of time for perimeter treatments and any warranty will be subject to the home owner carrying out regular inspections.

OWNER'S OBLIGATION

Home owners should ensure that conditions around the home are kept dry with proper surface drainage maintained.

It is important not to stack timber under the building or up against the external walls as this can allow undetected entry.

Regular inspections must be carried out by trained persons. The home owner will also be responsible for the ongoing retreatment of the chemical barrier at maximum intervals noted on the registered chemical labels.

- Reticulation Systems

A reticulation system is a more convenient means of retreating under the slab area, through an approved distribution system placed prior to the installation of the slab.

The reticulation systems must satisfy the performance requirements of the AS3660.1 - 1995, and should be accredited by a recognised body.

All chemicals used in reticulation systems must gain the approval of the NRA for use in the system.

The requirements for reticulation systems are no different from any other method of applying chemicals apart from the ease of retreatments.

WARRANTY

Home owners should check the warranty conditions first to ascertain the extent of their on-going commitment to ensure the continuation of the warranty.

OWNER'S OBLIGATIONS

Annual inspections by trained persons will be required together with the maintenance requirements for all other termite barriers. The continuation of the warranty will depend upon annual inspections being obtained and providing a favourable report.



Termite Resistant Materials



If termite resistant materials are to be used, the Building Code of Australia requires, as a minimum, only Primary Building Elements (PBEs) to be resistant to termite infestation. The PBEs of a building are generally the main structural components and may include the roof structure, walls that support a load (horizontally and vertically), beams, columns, floor structures and stairs.

Any coverings or claddings over the structural elements, doors, skirting boards, window sills, etc are not considered to be PBEs.

Materials that are deemed resistant to termite attack includes:

- Steel
- Concrete
- Masonry
- Fibre-reinforced cement
- Many naturally termite resistant timbers such as ironbark and cypress (as listed in Appendix A of AS 3660.1)
- Preservative treated timber

As the legislation requires only the PBEs to be termite resistant you need to be aware that other timbers or any material containing cellulose - their principal food - will remain susceptible to attack. These materials could include the contents of buildings such as built-in cupboards, skirting boards, furniture, some carpets, fabrics, packing cases and other similar materials such as electrical cables, plastics and other softer materials.

WARRANTY

Some home warranty insurance schemes may require additional measures over and above the minimum requirements of the Building Code of Australia.

Home owners should ensure that regular inspections are carried out and that a record is kept of the inspections.

OWNER'S OBLIGATIONS

You should ensure that conditions around the home are kept dry with proper surface drainage maintained. The ground surface needs to be kept graded to ensure moisture does not pond or accumulate in any area.

It is important not to stack timber under the building or up against the external walls as this can allow undetected entry.

Regular inspections should be carried out by trained persons such as a licensed pest controller or accredited pest inspector. A record of these inspections should be kept by the home owner as proof of this on-going maintenance.



Further Information

For further advice on how you may obtain more information on any of the methods or other requirements referred to in this booklet, contact the following organisations:

Information on the Termite Standard:

Standards Australia
(Country Callers) Free Call

Ph (03) 9693 3555
1800 672 321

Information on the use of Timber:

Timber Advisory Council
180 Whitehorse Road, Blackburn 3130

Ph (03) 9877 2011

Information on Barrier Systems:

Can be obtained directly from the Manufacturer



9411 4555
www.mbav.com.au



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