



WATERPROOFING BASEMENTS

It's not worth taking risks cutting corners when waterproofing basements. Following good waterproofing practice should see you right, even in wet years.

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Recently, a friend asked me to look at his leaking garage. It was about 25 years old, and one wall was reinforced concrete cast against a bank without any built-in drainage or waterproofing. Since he had owned the property, there hadn't been any leaks in the wall but now there was a steady trickle from several places. Fortunately, the water only affected the garage so it was an inconvenience, not a major problem.

The resistance of the wall had been sufficient to keep out the water behind it in normal years, but not after the wettest July on record.

It reminded me of an article I wrote for *Build* some years ago entitled 'Reduce the risk of leaking basements' where I likened the risk of inadequate waterproofing to making a bet. The introduction read, 'Would you take a bet if the returns are small and the stakes, if you lose, are very high? Yet this is the sort of risk BRANZ believes builders are taking regularly when they build basements with inadequate waterproofing.'

Win small or lose big

The way the bet works is this – you make some savings by:

- using a low-cost waterproof membrane that is not guaranteed by the manufacturer
- not worrying too much about the standard of work or number of coats applied
- skimping on the drainage behind the wall.

You are betting that the basement or retaining wall won't leak, and if it doesn't, you keep the small winnings.

But if it does leak, you lose, and it's going to cost big money to fix. One exceptionally rainy period could lead to a bigger problem. Consider what remedial work can be involved: excavate out behind the wall(s); install new damp-proof membrane and drainage; backfill; make good gardens, footpaths and driveways; and pay for consequential damage to the owner's belongings.

Why take the risk?

There seem to be three reasons why builders and designers take risks with waterproofing below ground level.

- The site seems dry, and problems with water seem unlikely – but circumstances can change.
- Properly executed basement waterproofing costs more, requires more care and its benefits are not obvious because it's covered over.

- There is ignorance of good waterproofing practice, particularly a belief that different types of membrane can be successfully combined and sealed at the joint.

Good waterproofing practice

There are four important elements that contribute to good waterproofing practice (see Figure 1).

The structural wall

The structural wall must be of high quality to withstand the pressure of the soil it retains, but even good quality dense concrete construction may →

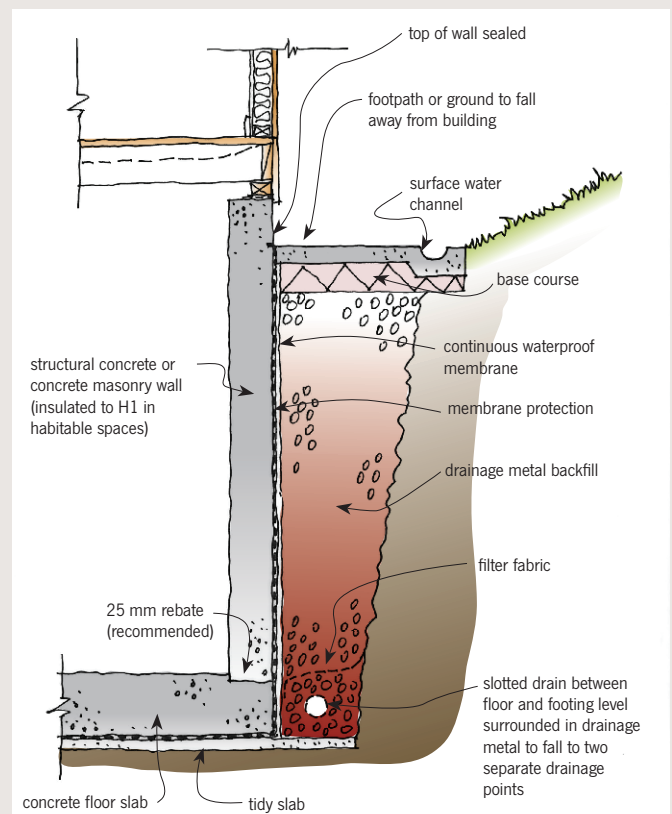


Figure 1: Elements of basement waterproofing.

not prevent the passage of water vapour. It still has a tendency to shrink and crack, allowing free water to penetrate. Concrete masonry walls are porous and must be sealed.

The waterproofing system

Sometimes referred to as 'tanking', the waterproof membrane is a continuous impermeable layer surrounding the basement below ground level. By 'continuous', we mean the same type of membrane under the floor and behind the walls. There are good reasons for using the same membrane throughout, mainly:

- water penetration can occur at any point – so the risk is the same
- it is often difficult to form an effective seal between different products
- manufacturers are unlikely to guarantee a joint between their product and another. If there's a failure and you have combined two products, you're on your own!
- manufacturers of some commonly used damp proof membranes or concrete underlays, such as laminated polythene, do not recommend their use on walls.

Make no mistake – quality membranes used in accordance with the manufacturer's recommendations cost more, but they do the job and they usually carry a warranty.

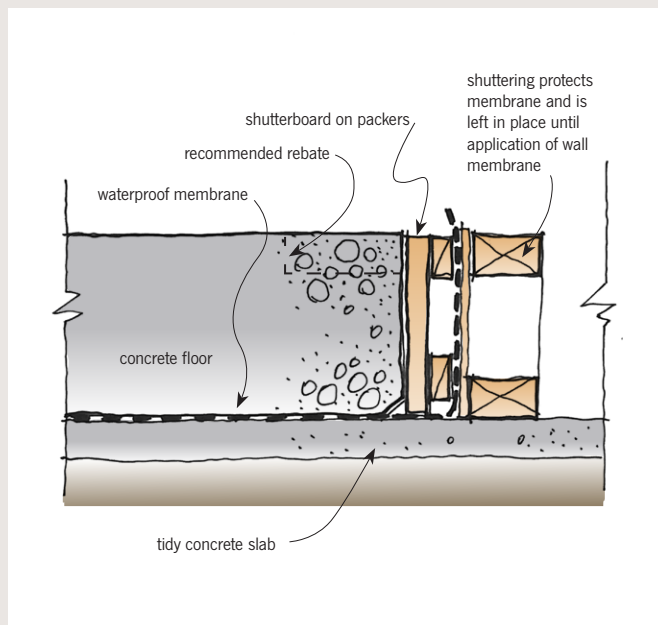


Figure 2: Suggested method of protecting sheet membrane at junction of floor and wall during construction.

Protection of the membrane

Membranes can fail if they are damaged during construction. It's best to use a method of protecting flexible sheet membranes that also helps to form a good overlap between the floor and wall membrane (see Figures 2 and 3). Damage can also occur from sharp stones during backfilling with drainage metal. Protection is best provided by lightweight, durable rigid sheeting such as treated plywood or extruded polystyrene. Alternatively, a proprietary drainage/protection product can be used.

Subsoil drainage

Unless it's able to drain away, ground water can build up behind the wall. This can exert high pressure and force water through even minute faults in the membrane. Good drainage is essential and should:

- discharge in two directions in a position where it can be accessed for cleaning
- have at least 100 mm of drainage metal below the slotted drain – this allows fine silt to filter down without settling in the drain
- be protected by a filter cloth. ◀

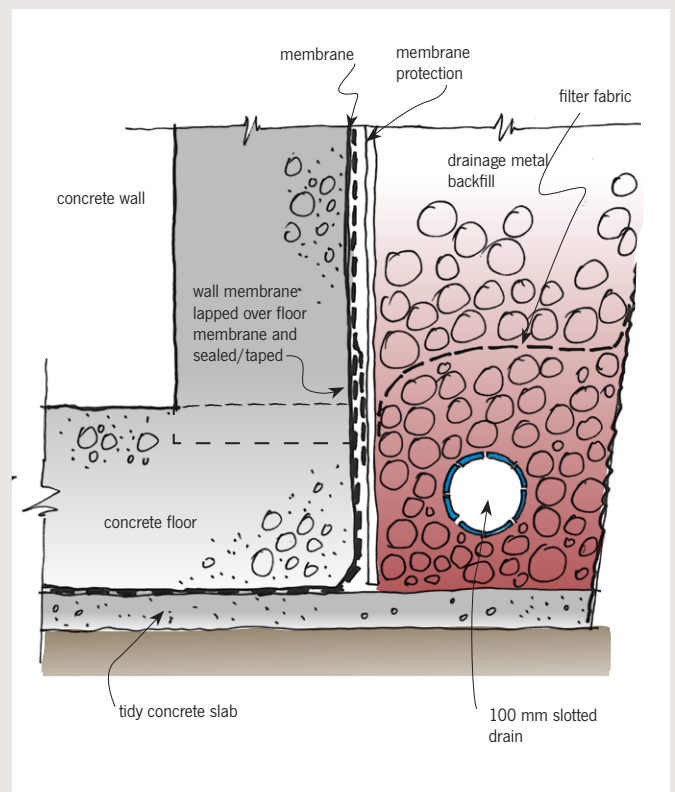


Figure 3: After the wall is cast, the floor membrane is fixed on the wall and the wall membrane is lapped over it and sealed/taped.