By Barry Schafer, *(Chair of Standards Australia Committees on Waterproofing)*

WHOLE FLOOR WATERPROOFING OF BATHROOMS ON TIMBER FLOOR SUBSTRATE

There has been some criticism from the construction industry about the new requirement in the 2004 revision of AS3740 "Waterproofing of wet areas within residential buildings": to waterproof the whole bathroom floor when it is built using a timber floor substrate. This requirement is set out in Table 4.1 of the standard. Its inclusion was made after considerable discussion by the committee on how to limit damage from leaking that was occurring on timber floor substrates in domestic construction. From data on costs of claims for faults in domestic construction, water damage from leaks within bathrooms was found to be the single biggest cost, with most being in relation to construction of timber floor substrates. The committee therefore considered that this type of construction needs additional waterproofing, than that required on concrete floors, which are the other most common floor construction in domestic situations. Due to the fact that structural damage is not caused to concrete floors, they are dealt with differently providing there is a perimeter sealing of the wall-floor junction of the bathroom to prevent damage to wall framing.

The difference with timber floors, compared to concrete, is that once water finds its way outside the waterproofed area it can spread a considerable distance along the floor substrate by capillary action along joins in its construction. This action can cause damage to structural timber components, in addition to aesthetic damage that occurs along the leakage paths. The current Building Code of Australia uses AS3740–2004 as the "deemed-to-satisfy" solution to the performance requirements of the code, thus the standard needs to ensure that the structural integrity of the building is maintained. It was for this reason that the inclusion of whole-floor waterproofing of timber floor substrates was included in the standard.

Water may find its way outside the designated shower area in the following ways:

a) Leaking shower screens
b) Screen doors not being closed
c) Incorrect waterproofing detail
d) Incorrect waterproofing application
e) Failure of the waterproofing material

While points c) to e) are covered in AS3740, points a) and b) fall outside the scope of the standard. The whole-floor waterproofing requirement was included to prevent structural damage to the floor and supporting walls in the event of leaking from these causes. Also, with baths and spas there is the possibility of water leakage from splash and overflow of the vessels.

While there is no way one can control the shower screen door not being closed during operation, leaking shower screens is a continual problem. A typical example of damage caused by a leaking shower screen is shown in ***Figure 1*** where the bottom plate of the wall beside the shower has completely rotted away. In this case the shower recess used a pre-formed shower base but poor detailing of drainage at the base of the swing-screen door allowed about 30 per cent of the water draining down the

Figure 1 **Water damage to bottom plate of separating wall**

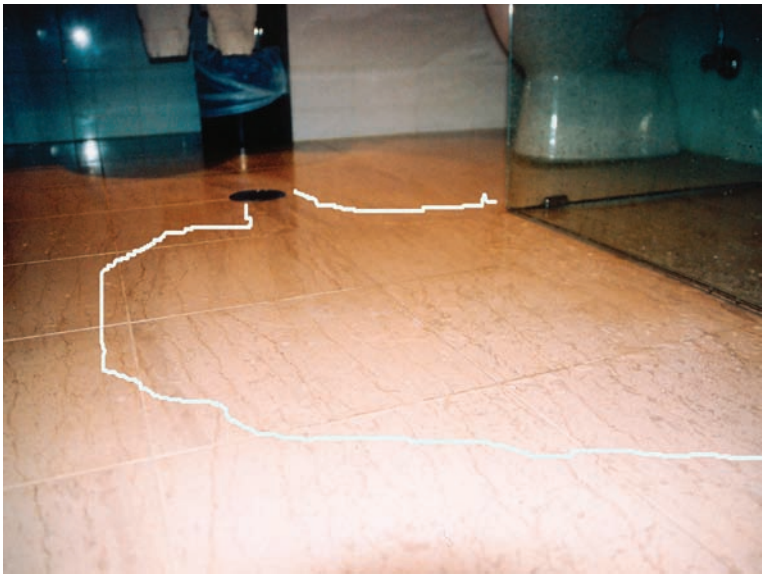

Figure 2 **Water flow from under a frameless-glass shower screen door**

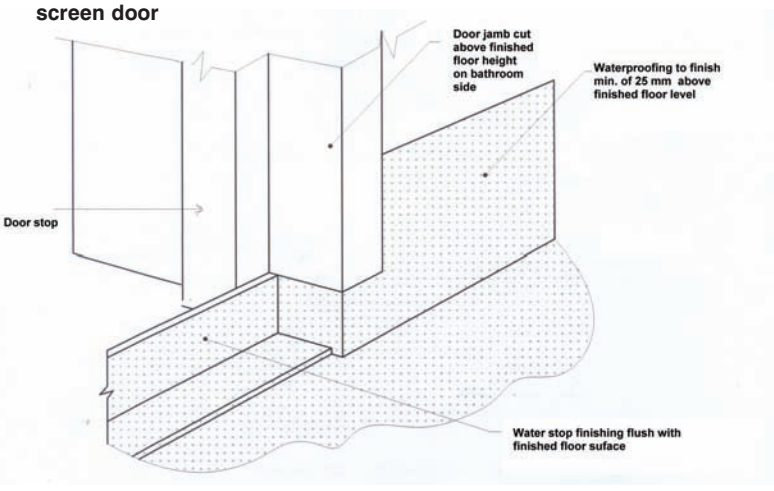

Figure 3 **Water stop installation at doorway**

door to flow out onto the bathroom floor. This is typical of the problems with this door design when the detailing does not catch all the water draining from the door onto the doorsill of the frame, and secondly with the sill not draining the water back into the shower recess. While this sounds like a basic design requirement there are a number of screens on the market, like the one that caused this damage, that fail to meet this basic requirement. The design aspect being overlooked is that during the operation of the shower there is a considerable down draft within the shower area that results in strong airflow out under the door. It is this airflow that carries the water draining from the door over the sill. There are two contributing design factors to this type of leakage: one being the lack of the drip former on the base of the door, the other is inadequate sill details, in either width or up-stand to retain the water landing on it. Not having a drip former allows water to flow across the bottom edge of the door, by water surface tension, similar to the problem of water flowing down the outside of a cup or glass when you try pouring from it. The width of the sill and its up-stand need to be sufficient to retain and drain the water landing on it, against the air flow pushing the water towards the outside of the shower.

The frameless-glass shower screen, as referred to in the September–November 2003 edition of *Tile Today*, cannot be considered a shower enclosure. These screens, by their fundamental design requirements cannot stop water flowing out under the door opening due to the factors just mentioned. ***Figure 2*** shows the extent of leakage from one of these frameless-glass screen doors after a four minute shower. There was sufficient leakage that water was flowing down the floor waste in the general bathroom area before the four minutes of the shower had been completed.

With whole-floor waterproofing there is the requirement that a water stop is installed at the doorways into the bathroom. Two details are included in AS3740: one is where it is installed prior to the installation of architraves and doorstops, the other is after their installation. The preferred option is for the water stop to be installed prior to the architraves and doorstops as shown in ***Figure 3.*** The main problem with the detailing of this doorway water stop is that the water stop needs to finish flush with the finished level of the floor surface. Often the waterproofer may not have the information required to set the top of the water stop at the correct height. One way of overcoming this problem is for the Waterproofer to install the water stop below the expected height of the finished floor level and the tiler to extend it to the finished floor level height by either bonding an angle onto the water stop making sure that the bonding makes a watertight seal to the existing water stop, or fitting an angle on the outside of the waterproofing and making a watertight seal to the top of the existing water stop. This second method is not possible where there is carpet to be installed in the adjoining room, as the base of the angle extension would inhibit the installation of the finishing trim for the carpet.

Hopefully this article will have helped to clarify the reasons behind the different requirements of waterproofing of timber and concrete floors required for bathrooms in the new addition of AS3740. ❑