Diagnosis and Repair of Water Seepage (Part 3 of 3)
Evaluation of Various Seepage Repair Methods through a Post-Repair Survey

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BACKGROUND

Seepage can come from different sources and exist in various forms, including floor seepage due to waterproofing failure, external wall seepage due to rain penetration, internal wall seepage through bathroom dry wall partitions, embedded pipe leakage, etc. Among the various forms of seepage, floor seepage usually presents the greatest problem, as it involves upper and lower flats, while disturbing rectification works are often required for the upper flat instead of the complainant’s flat.

There are three comparatively common seepage repair methods in dealing with floor seepage. These methods are tanking (a complete re-laying of the waterproofing layer), chemical injection, and deep penetration chemical treatment. All have been used for many years. In the following paragraphs, we shall look at the specifications and effectiveness of each repair method.

SPECIFICATION OF THE REPAIR METHODS

The recommended specifications for the three methods are described below:

(a) Tanking system
- Fast-setting character for occupied flats;
- cemenitious system, coating, or screeding type is often needed for fast-setting purposes and for existing damp substrate; therefore, those cold cure flexible membrane types are not suitable for seepage cases;
- existing floor drains, if removed, should be replaced by well-fitted replacements;
- the proprietary waterproofing system should have a waterproofing layer or it should penetrate and crystallize into the substrate capillaries/pores and block the passage of water;
- suitable for vertical surfaces if applied to walls;
- capable of sealing static cracks and capillaries;
- compatible and bonds well with all surfaces; and
- complies with Air Pollution Control (VOC) Regulations.

(b) Chemical Injection
- Polyurethane or other suitable resin;
- reacts with water;
- if polyurethane is used, it shall foam up to fill in voids/cracks and the foam shall be of a closed cell structure;
- able to seal hairline cracks smaller than 0.5mm;
- viscosity should not exceed 700mPas at 20 degrees;
- minimal shrinkage for elastic injection materials and no shrinkage for semi-rigid or rigid injection materials;
- non-flammable and can be painted on;
- non-toxic and does not constitute a safety hazard to operatives and occupants;
- for crack repairs, drill holes beside the cracks at 45 degrees inclined from the crack surface to a depth of half the thickness of the ceiling slab and at intervals of about 150mm c/c;
- for porous concrete repairs, drill holes vertically at intervals of about 100mm c/c and at a depth of half the thickness of the slab; and
- apply the second injection after the first injection unless otherwise recommended by the manufacturer.

(c) Deep penetration chemical treatment
- For waterproofing materials based on Silane/Siloxane/Silicone technology (perhaps in combination with a silicate penetrating material), the recommended minimum content of Silane should be at least 35% (use of Trimethoxysilane is not permitted);
- water-based, odourless, and of low VOC not exceeding 100g/L;
- suitable for tiled and slightly damp surfaces;
EVALUATION OF THE EXISTING SEEPAGE REPAIR METHODS

In order to systematically appraise the performance of these three common methods, a large scale evaluation was conducted in 2010 by re-visiting some 255 flats with repairs done in the immediate past four years and recording the dampness readings with moisture meters. This large scale evaluation covered 61 estates and 255 flats.

EFFECTIVENESS OF THE VARIOUS REPAIR METHODS

First, it is necessary to define the term ‘success rate’, which is quoted in the evaluation results below. The rate excludes all ‘moderate’ and ‘serious’ seepage cases, but include ‘very mild’ seepage cases, since ‘very mild’ seepage is unlikely to produce any visible defect or nuisance to tenants due to the minute amount of moisture present in the concrete, which normally could only be detected with a moisture meter. Based on the large scale survey results, the following findings are revealed:

(a) The ‘tanking’ method, with a success rate of about 80%, is regarded as a practical and comprehensive repair choice although there is certainly room for improvement, as we found that many unsuccessful cases were likely related to poor workmanship and difficulty in treating the waterproofing around the pipe penetrations or floor drains, even if the material factor could not be excluded.

(b) ‘Chemical injection’ had an unexpectedly high success rate of 85%, suggesting that this method is reliable if the situation is appropriate for employing it. The results also showed that performance did not deteriorate with time (at least not during the four-year period). One possible reason for the high success rate could be that site inspectors precluded the use of this method for serious seepage cases. Despite the method’s proven effectiveness at stopping water leakage from above, any trapped moisture above the grouted layer of the ceiling slab may lead to a deterioration of the concrete structure in the long term.

(c) ‘Deep penetration treatment’ tends to be more effective at stopping wall seepage (94%) than floor seepage (67%). Among the three methods, this has been used the least, as the odour it produces often leads occupants to reject it. Since many suppliers now produce odour-free alternatives, this method could be reconsidered if the seepage is mild and the condition of floor finish is suitable for its application.

(d) The success rates of the various repairs should be taken for broad reference only, as they could have been affected by many factors like workmanship, source of seepage, site restraints, etc. Since then, we have reviewed the repairs specifications and quality control verification requirements and believe that the success rates will go up in the future.

CONCLUSION

Apart from the above three methods, other localized repair methods have emerged in recent years. They include the pipe plinth jacket, which covers the pipe plinth with a layer of high flow waterproofing grout to seal up localized cracks or gaps around pipe penetration areas.

When considering which repair option to adopt, apart from pondering the effectiveness of each method, the extent and nature of the seepage (whether it is local or extensive) should also be taken into account.

Tanking is more effective for generalized floor slab seepage, but involves more disruptive work. Localized seepage could be resolved with less disturbing methods, including chemical injection, deep penetration treatment, high flow grouting around the pipe plinth/floor drain, the replacement of embedded leaking drains, etc. Diagnosing the source of seepage would help one select the most suitable repair method and is the most important first step in resolving the seepage nuisance.
Interpretation of Construction Contracts: No New Thing under the Sun (Part II)

In the second part of his article below, Mr Chung continues his analysis of the following waiver provision:

**SCC-20(6)(4)** The Main Contractor also hereby irrevocably waives any right to direct loss and/or expense and any other claims (including claims for damages) arising from any circumstances for the first 90 calendar days of extension of time granted by the Project Manager...

### The objective theory of English contract law

Unlike contract law in France and many other European countries, English contract law is based on the “objective” theory. This theory was trenchantly expressed by Lord Hoffmann in the recent case of *Chartbrook Ltd v Persimmon Homes Ltd* [2009], 1 AC 1101, as one that:

…mixes up the ascertainment of intention with the rules of law by depersonalising the contracting parties and asking, not what their intentions actually were, but what a reasonable outside observer would have taken them to be (emphasis mine).

### Analyzing the language used

Mr Hon also relied on “arising from any circumstances” to support his opinion that only an EOT with an L&E entitlement was contemplated by the first 90 days by reading these words as referring back to “[the waived] loss and/or expense”.

I disagree. My first observation is that the words used in the provision are “waives any right to direct loss and/or expense” and not “the waived loss and/or expense”. My second observation is that I read the expression “arising from any circumstances” as referring back to both limbs, namely the “direct loss and/or expense” limb and the “any other claims (including claims for damages)” limb, instead of just the first limb as Mr Hon suggested. If my readings are correct, the Contractor should be taken to have waived “any right to direct loss and/or expense arising from any circumstances” as well as “any other claims (including claims for damages) arising from any circumstances” for the first 90 calendar days of [the] extension of time granted.

In my view, the crucial words are “for the first 90 calendar days of [the] extension of time granted” because they provide the proper context in which to construe what the Contractor was being asked to waive be it the L&E or any other claim arising from any circumstance for the first 90 calendar days of the EOT. The words “for the 90 calendar days of [the] extension of time” are perfectly plain and contain no indication, one way or another, of which EOT events should form the subject matter of the first 90 calendar days of the EOT, as any permutation of EOT events will do. As such, “the first 90 calendar days” must embrace both entitling and neutral events.

I now turn to the words, “any right to direct loss and/or expense”. If the EOT comprising the first 90 calendar days, properly construed, should include both entitling and neutral events, the permutation of the first 90 calendar days of the EOT would not become known until the first 90 days of delay materialized, and neither would the question of the Contractor’s L&E entitlement. “Any right to direct loss and/or expense” must therefore mean “any right to direct loss and/or expense that may arise”.

Mr Hon’s interpretation has an insurmountable hurdle. If he is correct, then the words “the first 90 calendar days of [the] time granted” would have to be understood to mean, in effect, “the first 151 calendar days of [the] time granted” based on what actually occurred (the first 61 days of the EOT being granted for inclement weather [a neutral event] plus another 90 days yet to be granted [presumably entitling event(s)]). This cannot be right.

### The courts do not easily accept that people make linguistic mistakes

Is there an answer available to the Employer for why the language used in SCC-20(6)(4) failed to reflect what was intended? As noted above, the question of what was intended could only be determined by referencing what a reasonable person with the background knowledge would have understood what the parties had agreed upon. In any event, the courts would require a very strong case before they can be convinced that the words used by the parties do not reflect their agreement. In *Chartbrook Ltd v Persimmon*...
Homes Ltd [2009], 1 AC 1101, Lord Hoffmann said:

…[The courts] do not easily accept that people have made linguistic mistakes, particularly in formal documents.

Construction contracts are formal documents. The courts will not easily accept that waiver provisions, which are intended to curtail or even extinguish a contractor’s right to compensation, do not mean what they plainly say.

To conclude, I read SCC-20(6)(4) as simply requiring the Contractor to waive whatever right to the L&E he might have for the first 90 calendar days of the EOT granted for whatever ground(s).

For the sake of completeness, I turn to a more delicate point.

Is the Contractor’s “understanding” relevant to interpretation?

I have said above (and in Part I) that what the Employer “intended” SCC-20(6)(4) to mean is irrelevant to its interpretation. How about the Contractor’s “understanding of its meaning?” The simple answer is also irrelevant.

But what the “tendering contractors” as a group understood SCC-20(6)(4) to mean may not be irrelevant. In Investors, Lord Lloyd1 particularly stressed two factors:

(i) the purpose of the document falling to be construed and

(ii) the readership to whom the document was addressed.

The document in Investors was a claim form. Its “purpose” was to inform the investor in relatively non-technical language what his rights and liabilities were upon his receipt of compensation. On “readership”, Lord Lloyd cited, with approval, Lord Diplock’s judgment in Porter v National Union of Journalists [1980], I.R.L.R. 404:

The readership to which the rules are addressed consists of ordinary working journalists, not judges or lawyers versed in the semantic technicalities of statutory draftsmanship (emphasis mine).

Is the “reasonable man” the same man in all cases?

The intended readers of SCC-20(6)(4) were those invited to tender for the renovation contract, including the one who won the contract. What they as a group understood about the extent of the L&E entitlement which they were asked to waive seems to me to be a relevant consideration. Of course I am not suggesting that the Contractor could call other tenderers as his witnesses for the purpose of explaining to the court their understandings of the clause. That would be inadmissible because they, too, would be giving evidence of their “subjective” understandings of SCC-20(6)(4) and that would infringe upon the objective theory of interpretation.

In my view, the court may be asked to consider what a “reasonable tendering contractor” with the parties background knowledge would have understood the clause to mean. He would not be the same “reasonable person” on the street, but one with all the attributes of the tendering contractors.

The contra proferentem rule

Had SCC-20(6)(4) been ambiguous and capable of two reasonable interpretations, the court would have had to apply the contra proferentem rule and adopt the interpretation less favourable to the Employer (on whose behalf the ambiguous waiver provision was drafted), but I do not see any ambiguity in SCC-20(6)(4).

For the above reasons, I would have placed my bet on the Contractor’s interpretation.

Let wiser heads settle it

I set out above what I understood to be the guiding principles for interpreting commercial contracts by referring to some leading cases that were recently decided by the highest courts in the UK. But these cases merely served to underline the strength of the established principles and demonstrated how they could apply to new circumstances. But there is no new thing under the sun so far as this area of law is concerned. I hope these cases can assist the ordinary quantity surveyor in drafting and interpreting contractual clauses.

In the course of illustrating the application of these cases, I adopted Mr Hon’s case as a working example and put forward my alternative opinions for readers consideration. As Chief Justice Holt once said after he had done research on his own: “I have stirred these points, which wiser heads in time may settle.”

1 Lord Lloyd was the dissenting judge in Investors, but this part of his speech was not contradicted by the majority.
The first time I came across the word ‘columbarium’ outside Hong Kong was in a visit to Masada, the former King Herod’s summer palace which was later turned into a Jewish revolutionary base against the Roman Empire during the First Century. It was built on a remote high ground overlooking the Dead Sea in the distance and, given its topography, was an ideal place for a fortress. Inside the fortress, there was a little space designated as a columbarium where pigeons were bred in the niches. Pigeons were a source of meat (protein), which was particularly important during the Roman siege of the fortress. When Masada finally fell to the Romans, they found the place empty and quiet, with only two women and five children left behind. The rest of the defenders knew too well the fate that awaited them in the event of their capture and decided to end their lives violently on the night before the Romans stormed the fortress.

Over time, the niches became deposit places for human remains. These are the catacombs. I would imagine that they have become popular because they take up less space and are an effective means of land utilization. Columbaria now assume different forms that often reflect the culture and history of their locales. The Columbarium of San Francisco, with its beautiful architecture, is such an example. Some cultures may accept human ashes to be located close to living quarters, but other cultures treat them as “unclean,” although in terms of hygiene, they are not sources of disease, as the process of cremation involves the application of high temperatures. But culture plays an important role in the planning for the location of a columbarium.

In Hong Kong, columbaria are either provided by the government or the private sector. Niches in public columbaria are neat and tidy and relatively inexpensive, whereas private niches sell such added values as good feng shui and maintenance services, including certain religious rituals. Some private columbaria are run by non-profit organizations and are religious. Notably, prices for private niches vary a lot. So far, public niches are in short supply, while private niches are an extremely lucrative business. That explains why even illegal niches sell at high prices. Those who buy them are running a high risk of being denied access to their ashes once the government reclaims the space. Moreover, the public may eventually have to pay for putting things back in the right order.

As our population, prompted by the post-war baby boom, is ageing rapidly, the demand for niches will escalate over the next ten to 20 years. The government should consider opening up the market to more private participants. This may take on the form of open competition through bids for some government sites suitable for such purposes and allowing for land exchanges or lease modifications on private lands. There are sites already zoned and marked for columbaria on town plans. No one expects that this will be an easy job because of NIMBY*. In the meantime, the government should consider excising certain parcels of land within Wo Hop Shek Public Cemetery for such purposes pending new zoning or rezoning of suitable sites. In planning the former closed areas, such as Hung Lung Hang in the North District, the Government should consider zoning part of these areas for columbarium purposes. In the long run, columbaria are a big industry.

"Po Fuk Shan is an example of an in situ land exchange through which the Government disposed of a site for a private columbarium purposes. The architecture is an imitation of that of the Tang Dynasty. Prices of niches vary with ‘feng shui’ and services."

The industry will grow as more private funds are poured in. But the above does not take away the government’s responsibility to provide basic niches. With the introduction of proper rules and regulations and an adequate supply of public and private niches, the market can more effectively regulate itself.

The Government should not allow the problem to drift away. At the moment, grievances are mounting, as people find nowhere to put their relatives’ ashes after cremation and there is a long queue for public niches. The success of a government’s administration is not only judged by what it has done for its people, but also by how its people are treated. This includes their journeys to their final resting places.

*NIMBY: Not In My Backyard