

focusfirst

Construction factsheet

Escape of water

– an awareness guide for construction companies

The trend of losses in the construction industry has changed significantly in recent years with statistics now showing that 28% of residential and commercial property claims made in 2007 resulted from water escape.

Counting the cost

The effect of a water leak towards the end of the fit-out can cause significant damage and could add months to the construction period. The exposure to delays, insurance excesses, penalties, reduced bonuses and indirect costs can have a significant impact. Reviewing site processes and staff training can help you to manage the risk of an escape of water.

To help you minimise the risk and to demonstrate how to deal with an incident, Zurich, Beachcroft LLP and Crawford and Company have produced an awareness guide.

Things to consider

There is no one solution to the problem but this document aims to draw upon our collective experience to provide suggested improvements that can be adopted in the areas of design, subcontractor selection and control, site management and control and testing and commissioning.

Design

Certain design features, if not the initial cause of damage in themselves, can greatly exacerbate the nature and extent of damage:

- **Design and build.** Involving the Insurer at the initial design stages could help to ensure that the optimum solution is achieved, not only for the construction period but also over the life of the building.
- **Have potential design issues been considered.** At the design stage, it may be possible to identify and design-out certain unfavourable features, for example: design and location of water tanks; jointing and location of water pipes; location of isolation valves; the use of porous cabling and open risers.
- **Phasing.** To reduce the likelihood and severity of damage it is prudent that the works are phased.

- **Combined Service Risers.** Combining water and electrical services in undivided risers is one of the most significant factors in increasing the severity of water damage losses. They should be avoided. Once exposed to water, the majority of electrical and data cabling has to be replaced which often delays the completion of the project and brings with it associated costs.
- **Location of water tanks.** Tanks should not be located above electrical switchrooms. All tanks should be bunded with suitable drainage. High level alarms should be fitted to tanks. During construction works the isolation of booster pumps presents a cheap and simple method of mitigating the risk.
- **Shut-off valves.** If possible, shut-off valves should be fitted on every floor. For very large floors, multiple valves may be required. Valves should be readily accessible and clearly marked with the areas that they isolate. Consider position of isolating valves. Valve cupboards should be on a master key or access control system and readily accessible.
- **Upstands at riser openings.** Consider the provision of upstands (say 100mm high) at riser openings to prevent water that has escaped onto floor plates from flowing down service risers.
- **Water management devices.** Devices should be fitted to the incoming mains and at other appropriate strategic locations such as header tanks.
- **Drainage.** Drainage, with full functionality, should be installed as early as possible in the construction.
- **Routing of pipework.** Pipework should be routed to avoid sensitive areas such as data processing rooms. IT areas should also be avoided. Where unavoidable, the early use of drip trays and leak detection within the trays should be employed. It is essential that access is available to all pipework after the construction of the building has been completed.
- **Pressurised systems.** Failure to purge pipework may result in a significant build up of pressure once the pumps are reengaged. Careful design, supervision and clear operating instructions may avert potentially catastrophic failures.
- **System selection.** Careful consideration is required when selecting plumbing systems. This should be based on a risk assessment with relevant considerations to include the following: the standard of fitters likely to be employed; the level of on-site supervision; the potential for water damage; the location and accessibility of pipes once installed and the post loss mitigation measures planned.

Subcontractor selection

The competence of potential subcontractors should be assessed before they are appointed, for work done with the system(s) and equipment to be used during the project(s) under consideration. Competence assessment requires consideration of a number of features, as follows:

- **Track record.** Obtain references from previous employers – Principal Contractors for whom the subcontractor has worked in the recent past
- **Insurance records.** Public Liability and Contractors All Risks claims histories, showing the number and severity of claims on these covers arising from water damage
- **Industry Bodies or schemes.** Is the company being considered affiliated to any professional bodies or part of an approved Contractor scheme? Certain industry bodies such as the Institute of Plumbing (IP), the Association of Plumbing and Heating Contractors (APHC) and the Heating and Ventilation Contractors Association (HVCA) are voluntary organisations which promote professional standards in their membership and provide assistance with training and development. Membership of such an organisation should be an indication of the quality of workmanship that can be expected. Similarly, there are certain schemes which also provide a guide to the quality and professionalism of a company.
- **Specialist areas of work.** Does the company being considered specialise in the use of the system(s)/ equipment proposed for use, or are they general contractors in this field. This is based on the assumption that specialists present a lower risk profile than generalists
- **Stability of the workforce.** The track record of a company with a stable workforce (low turnover of staff and managers) is likely to be a better guide to its future performance than a company with a high turnover
- **Subcontracting by the subcontractor.** The same issues will be relevant to any subcontractors the subcontractor uses. Long subcontract chains are generally associated with higher levels of risk, as control and standards are more difficult to maintain. Pre-contract checks should extend to all contractors in the subcontract chain

Contract conditions can also have an influence on the risk of leaks and water damage occurring. If subcontractors are required to insure their own works until they are completed or commissioned it is likely that they will have more incentive to ensure that their workmanship and supervision is of a high standard, as they will suffer financially for any damage that does occur.

Subcontractor control

Subcontractors to agree a formal inspection and test plan before the work starts, then work together with the Contractor to ensure that it is fully implemented on the site.

The most important features are:

- The use of trained and competent individuals to carry out the work
- The adherence by those individuals with the correct systems and procedures for carrying out the work
- The application of a practical quality assurance system, to make sure that:
 - All parts of the installation are installed in accordance with the relevant standards, procedures, manufacturers' instructions etc
 - The person doing the work verifies that this is the case
 - Sufficient inspections are carried out by managers/supervisors of the contractor and subcontractor to give reassurance that the work is being carried out correctly as it is being done
 - A suitable and sufficient regime of testing is carried out once the work is complete, to ensure that it is defect and leak-free

Site management and controls

- **Responsibility.** A nominated individual should be appointed with overall responsibility for management of the water damage risk.
- **Ongoing communication between parties**
 - **contact sheets?** The need to maintain a credible line of communication and accessibility between the office-based design team and site supervisors, trades operatives etc is vital
- **Joint identification.** Should a leak occur a colour coded joint will enable the negligent contractor to be identified.
- **Ensuring that fitting instructions are passed on including:**
 - What tools to use and how to cut
 - Importance attaching to operational manuals
 - Adherence and verification of test procedures and certification; independent witnessing; use of warranties/bonds
 - Strict compliance with design guidelines and manufacturer's installation manuals should be observed. Any operatives working on a system should have received on-site training by the system supplier. Training records should be maintained by the main contractor. No matter what the nature of the system, installation work must only be carried out by qualified and trained personnel.

Standards specified by the manufacturer often go beyond those laid down in the British Standards and other guidance documents so can often be regarded as 'best practice'. The training courses will often be vetted by bodies such as the IPHE.

- Inspection of drainage prior to connection
- Reference to industry installation standards and codes
- Reference to manufacturers' installation standards
- **Shut off valves:**
 - It is good practice to switch off water supplies to a building outside of working hours and at night. In order to do this, a master valve should be located at an accessible location and a responsible person nominated to perform the task. Where a boosted supply is installed, the booster pumps can be isolated, though consideration should be given to the effects of thrust pressure when these are turned back on: an engineering solution such as pressure reducing valves may be appropriate.
 - Security guards can be trained to provide an early emergency response and shut down systems where appropriate. Un-manned sites may be able to benefit from remote monitoring of leak and flow detection. Guards are often left out of emergency planning procedures, even for fire. They need to be trained in how to respond to a number of situations. They may be able to see water damage occurring but do they know how to deal with it? Also required are: clear site plan and well defined emergency procedures, a call out list and knowledge of, and access to, isolation valves. Consider spill kits and pumps on site.
 - Security guards should also be made aware of the location of the master valve so that they can check it is turned off outside working hours. In the event of unintentional discharge, they will also be able to cut off the supply by shutting the valve.
- **Monitoring the installation:**
 - Consider remote monitoring of unmanned sites and/or leak detection and flow devices linked remotely where sites are unattended overnight.
 - On-site security guard's duties should be extended to check for escape of water where wet services are live.
 - Routine patrols can be carried out whilst air conditioning and plumbing systems are tested and commissioned.

Testing/Commissioning

Not all piped systems are installed to recognised standards or fully tested following installation. All types of system, on sites of all sizes, have the potential to produce leaks, particularly at poorly-made joints or connections, and discharge large volumes of water causing extensive and expensive damage, particularly if leaks develop when the site is unattended – overnight or at a weekend. Action to be taken to prevent or minimise damage is set out below.

- **Installation standards.** There are many standards relating to the various aspects of plumbing, heating and ventilation systems. The two primary guidance documents are the Water Supply (Water Fittings) Regulations 2000 (applicable to plumbing systems) and the HVCA Good Practice Guides. These should be used in conjunction with manufacturer's installation guides (and on-site training) to achieve the optimum solution.
- **Pressure testing.** Unfortunately, it is not possible to be prescriptive regarding pressures to be employed and the duration of testing required. Each system will have its own specific testing criteria to be met. However, the following general guidelines should be observed:
 - Pipework should be subject to an initial air test followed by hydraulic testing
 - Account needs to be taken of the daily variation in mains pressures when determining the 'normal working pressures'
 - Failure to test an installation to the correct pressure for the required duration may nullify the manufacturer's warranty (this applies to pressures and duration being too low as well as too high)
 - Tests should never be conducted unattended
 - Pressure testing should be witnessed by the main contractor or a nominated third party
 - All sections of pipework should be certified to have met the test standard
 - The individual appointed with overall responsibility for management of the water damage risk should implement a procedure for independent third party certification of work carried out throughout the installation, testing and commissioning. This procedure should be documented and auditable.
 - Certificates should be issued for each section of pipework tested. There should be a third party responsible for auditing this paperwork
- **Commissioning procedures.** Full commissioning tests should be carried out on systems in their entirety including all equipment and fittings at their working pressure, in line with equipment supplier's guidelines. A minimum commissioning period of 8 hours is recommended which should be attended for its full duration. It is also strongly recommended that water management devices are installed with audible signalling to provide a warning of failure in any part of the system. Commissioning should be carried out during the day when there is more chance of a leak being detected and swiftly dealt with. Commissioning of systems when the building is vacant should be avoided at all costs.
- **Hot water.** Systems designed to carry hot water will be subjected to enhanced thermal movements. Cold water tests may be insufficient to uncover leaks when the pipes are subsequently subject to thermal expansion induced by hot water.
- **Documentation.** Once a system is complete there should be a full audit trail of all components used, the testing regime, commissioning procedures and approval certificates. The Water Authority will inspect all new-builds and issue a certificate of compliance which should be made available for third party audit.
- **Post-commissioning.** Leaks can still occur after commissioning has been completed, and this should be planned for so that the effects can be minimised. Managers, supervisors and security staff should be briefed to keep a watch for leaks and in the correct action to take if one is found. This should include information on the location and operation of valves, stopcocks etc. and the contact numbers of people/organisations who can help them: security guards should have numbers for members of the site management team; site managers and supervisors should have the numbers of the relevant sub-contractors plus appropriate disaster recovery specialists.

Industry recognised guidance documents should be regarded as the default position if manufacturer's guidance is not forthcoming eg. **The Guide to Good Practice Site Pressure Testing of Pipework** produced by the HVCA and also **BS6700**.

The HVCA produce a full range of guidance documents covering many aspects including testing procedures for a wide range of systems

After the Event (anticipating the claim)

An escape of water may result in a claim against you, although the claim may not materialise for several weeks, months or even years after the event.

The costs incurred following an escape of water can be significant. Part of these costs may not be covered by your Insurers.

A few simple steps taken immediately after the incident is a good starting point to enable a prompt investigation and full assessment of the incident, including determination of whether you have any liability to meet the costs incurred, or whether these costs can be recovered from another party.

In the aftermath of an escape, the following simple tasks may prove invaluable:

- preserve evidence and retain any failed joints/pipework, or know where these are retained. Ensure all parts of joint are retained, along with any pipework which has displaced from a joint, which should be clearly marked.
- take photographs of the failed joints / pipework in situ, including the immediate surroundings.
- obtain details of who discovered the escape and obtain a short statement of what they found, and any unusual events which occurred beforehand (such as loss of water, pumps cutting out etc).
- obtain details of those involved with the relevant work pre-incident, including all subcontractors, and any remedial work. Names and addresses should include home addresses, particularly for any subcontractors.
- If an emergency plumber was called to the scene, obtain full details of who the plumber was, and ask them to provide written record of what they saw on arrival and what remedial works were carried out.
- In the event of security staff being on site, ensure that they are aware of emergency procedures for switching off the water supply in order to prevent further damage.

The following information should also be obtained and collated at the earliest opportunity:

- a short statement summarising the incident, explaining where and when it occurred, who discovered the problem, what was found, and the extent of damage that may have been caused by the escape of water.
- set out details of all parties involved in the relevant work (including all subcontractors) and provide full contact details for each.
- obtain copies of all relevant design documents (such as drawings or specifications, including details of proprietary materials / joints used).
- obtain details of any commissioning checks undertaken, and a copy of any commissioning report or the like.
- obtain details of any maintenance carried out, or previous incidents of escapes on site – even if minor – and any remedial work carried out.
- obtain copies of relevant Contracts/Subcontracts.
- confirm whether any project insurance is in place, and if so, obtain details of that insurance. Likewise, obtain details of any subcontractor's insurance.

In addition to the steps set out above, you should inform your insurers immediately when an escape of water occurs. At the same time, provide them with information referred to above (or commence collation of this information to provide to them as soon as you can).

The insurer or the loss adjuster may have access to loss mitigation specialists whose prompt attendance will minimise the extent of the remedial work required. If a claim is subsequently made against you, taking these steps, and securing the information referred to, will enable the claim to be dealt with effectively and liability determined at an early stage, benefiting both you and your Insurers.

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