THE UK CAR

UNDERWRITERS GROUP

CIREG

CONSTRUCTION INSURANCE RISK ENGINEERS GROUP

Guidance Note on the Avoidance of Water Damage on Construction Sites

Over recent years the incidence (and magnitude) of water damage claims in the construction industry has been on the increase. The reasons for this increase are many and varied and the causes not always simple to tackle. Unfortunately, to date, the industry has failed to attempt any co-ordinated response to address the problem. The purpose of this document is to outline some of the ways in which the industry can attempt to tackle the root causes of the problem and also to suggest ways in which individuals can mitigate the effects of an incident should a loss occur.

This Guidance Note is intended for Projects during their Design & Construction Stage and also for On-going Construction Projects. It is acknowledged that whilst on-going projects would not necessarily have the immediate benefit of all the Risk Management measures proposed, it should nevertheless be used as a practical guide and a Best Practice reference point as the project develops.

1.0 Project Management

1.1 The Design Team should be tasked with designing out features that are known to exacerbate water damage losses and include those that may mitigate a loss should an escape of water occur. Examples of unfavourable features include: combined service risers; inappropriate or concealed pipework routes; positioning of water tanks; open risers; porous cabling; and electrical cables laid directly onto floor slabs. The design should allow for: additional isolation valves; riser upstands; full and easy access to pipes; and temporary drainage points from the floor plates, to help mitigate the effects of escaped water.

1.2 The selection of the water distribution system(s) should be based on a comprehensive risk assessment which should take into account the following factors:

- the loss history associated with various types of plumbing system
- the building occupancy
- the building's susceptibility to water damage (type and quality of finishing to be employed)
- the height of the building
- the presence of drainage points
- the quality of tradesmen to be employed
- design input & supervision
- testing/certification procedures
- the presence (or absence) of mitigation features (e.g. water management devices, bunding and leak detection)
- the presence of in-built system safeguards.

If the design and system selection is already complete then the adoption of other measures detailed in this document remain valid for effective risk control and mitigation.

1.3 The main contractor (or supervising authority) is to appoint a nominated individual (hereafter known as "the responsible person") with responsibility for management of the water damage risk. This individual must ensure:

- the selection and appointment of suitably qualified professional sub-contractors and labour
- incorporation of written procedures (with respect to installation, testing and commissioning) into contractual terms
- verification of installation standards and adherence to codes as detailed below
- that independent site checks and quality control are carried out
- pressure testing and commissioning procedures are completed
- third party certification of work
- written quality systems and document control are maintained

1.4 The works should be phased to reduce the likelihood (and severity) of damage from burst pipes or weather-related incidents. Roof and cladding to be complete and the envelope made water-tight before internal works of any description are carried out.

1.5 Drainage should be installed early with full functionality as early as possible, especially prior to wet services becoming live. Full functionality should be mandatory in vulnerable locations.

1.6 Ensure bunding is complete and drainage from plant rooms connected before tanks are filled. Aim to achieve early commissioning of sump pump alarms, leak detection, water management devices and also enabling of the facility to monitor these (often the Building Management System).

2.0 Sub-Contractor Appointment

2.1 Only professionally qualified plumbers to be permitted to work on water distribution systems. *It is strongly recommended that persons employed to work upon water distribution systems have, as a minimum, a NVQ level 3 (or equivalent) and are affiliated to an industry body such as the IPHE, APHC or HVCA (see below).* Unqualified operatives should never be engaged to work on water services.

2.2 Where new systems are employed using different techniques or bespoke machinery, all operatives should be fully trained by the manufacturer supplying the system and training records kept to verify this training has been completed.

2.3 The responsible person should ensure the on-site inspection and certification of the sub-contractor's work throughout the process. This task can be delegated to a suitably qualified, independent third party.

2.4 Companies and individuals engaged to work on plumbing installations should be affiliated to an industry body such as the Institute of Plumbing and Heating Engineers (IPHE), the Institute of Plumbing (IP), the Association of Plumbing and Heating Contractors (APHC) or the Heating and Ventilation Contractors Association (HVCA).

2.5 Plumbing and HV companies should be members of approval **s**chemes such as the IPHE Approved Contractor Scheme and the Water Industry Approval Scheme (WIAPS). Similar schemes are also run by some of the larger Water Authorities and are generally considered to be of equal status.

3.0 Quality Control

3.1 The Responsible Person 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.

3.2 All contractors should be required to work to industry recognised codes which should be clearly defined in all work specifications and contractual documents. The main applicable documents are: *Water Supply (Water Fittings) Regulations 2000; BS6700:2006 Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages : specification; HVCA Good Practice Guides;* and *CIBSE (Chartered Institute of Building Services Engineers)* standards.

3.3 Ensure strict compliance with design guidelines and manufacturer's installation manuals. 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, trained personnel.

3.4 All joints should be subject to a visual inspection as part of commissioning and for a period not less than 2 weeks thereafter. In areas where access is not possible for visual inspection, consideration should be given to leak detection at strategic points e.g. at the feet of service risers. This should form part of a formal, documented procedure which should also include testing of the pipework, commissioning and, ideally, third party certification.

3.5 All pipework should be subjected to a clearly defined Pressure Testing regime in accordance with the manufacturer's guidelines (which will be specific to the system employed). 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).

3.6 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".

3.7 Pressure testing should be witnessed by the main contractor or a nominated third party and should never be conducted unattended.

3.8 All sections of pipework should be certified to have met the test standard and certificates should be issued for each section of pipework tested. There should be a third party responsible for auditing this paperwork.

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

3.10 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.

3.11 It is advised 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.

3.12 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.

4.0 Mitigation

4.1 Switch off the water supply outside working hours. It is recommended that a master valve is located in an accessible location and a designated person nominated to perform the task. Where a boosted supply is installed, the booster pumps should be isolated. Consideration should be given to the effects of thrust pressure when these are turned back on.

4.2 Install a water management device on the incoming riser and programme it to shut down the water supply when water flows exceed pre-determined parameters; these parameters should be set in relation to normal water usage. The device should be set to shut off water supplies outside working hours when very small flows are detected. The device should have the facility to monitor normal water usage over a time period so it can then be programmed to allow water to be shut-off at a very precise, pre-determined flow rate outside of the normal usage parameters.

4.3 Dependent upon the configuration of the HVAC system, consideration should also be given to installing them on header tanks of enclosed systems. In a residential development if fitted to individual flats they can provide protection for finished units prior to occupation.

4.4 The water management device should have an integral battery back-up to ensure that it is effective during the testing and commissioning stage when power is often isolated for long periods. On unmanned sites such a device should be configured for remote monitoring.

4.5 Install and commission leak detection, with temporary alarms, in areas such as bunds, the bottoms of risers, equipment rooms, around AC units and in vulnerable cable trays. In an unattended building, alarms should be linked to pagers, or other form of remote monitoring, and an emergency procedure put in place.

4.6 Security guards, where present, should be trained to provide an early emergency response and to manually shut down systems, where appropriate. Un-manned sites may be able to benefit from remote monitoring of leak and flow detection.

4.7 Guards duties should be extended to routine patrols to check for escape of water where wet services are live. They should be trained in how to respond when discovering an incident. Similar emergency response duties to be allocated to nominated individuals where security is not employed or not present during the day.

4.8 A clear plan to be drawn up which must include well defined emergency procedures, a call out list & knowledge of, and access to, isolation valves. Spill kits and pumps should be made available.

4.9 Establish a plan for bringing in, handling and discharging temporary and permanent water supplies in the buildings under construction. Water Management Plans should include designated water discharge points/routes, and should include supply/discharge of water from roof drainage systems, sprinklers, HVAC systems and temporary welfare & accommodation facilities, where set up inside the building.

4.10 Temporary rising mains for use of wet trades should be tightly controlled with lockable discharge points. Water butts can be used to ensure only limited quantities of water are available inside the building.

4.11 Wherever possible, a permanent supply should be installed in preference to a less reliable temporary mains e.g. through utilising a fire fighting water supply. Temporary water discharge pipes must not be placed in electrical (or other water-susceptible) service risers.

4.12 All incidents of water escape or water damage should be fully investigated and documented. This information should be shared with the Insurance Company and, where possible, remedial measures put in place to prevent a reoccurrence. In all instances advice should be sought from the Insurer as to the most appropriate course of remedial action.

This guidance is endorsed by the membership of the UK CAR Underwriters Group and the Construction Insurance Risk Engineers Group (CIREG)

The UK CAR Underwriters Group			**CIREG**
ACE	Endurance	RSA	ACE
Allianz Cornhill Eng	FM Global	SCOR	Allianz
Allianz Global Risks	General Re	Swiss Re	HDI Gerling
Aspen Re	HDI Gerling	Tokio Marine Global	Mitsui Sumitomo
Axa Corporate Solutions	Houston Casualty	WR Berkley	Zurich Global
Beazley	Liberty	XL Insurance	
Catlin	Mitsui Sumitomo Insurance	Zurich Global	
Chaucer	Munich Re		
Chubb	Norwich Union		

Disclaimer

The guidance in this document is considered best practice loss control advice. Adoption of the provisions contained herein does not imply compliance with industry / statutory codes or guidelines nor does it guarantee that water related losses will not occur.