

Concealed water leaks in buildings can originate from many sources such as air conditioning units, cold-water chillers, water supply and drainage lines, and clogged drains, etc. Water leakage from external sources may result through damaged skylights or windows, cracks in external walls and roof terraces, separation cracks, construction errors, failure in waterproofing systems, failure in sealants provided at the junctions of window frames and masonry or even built-up condensation drips. With water-related damages in buildings rising, it becomes very difficult for remedial waterproofing without any proper diagnosis of the exact location of the leakage or the source of the leakage. Tracing the leakage by any trial and error method or by a conventional flooding test/spray test not only becomes time consuming, but is not always successful, as such tests only check the ingress of moisture/water, which may not happen during the test and may arise due to defects or discontinuity in a waterproofing system. Further, the leakage issue may be compounded where the roof terraces have an overburden as in the case of a roof garden or a vegetative roof system. With advances in the materials and systems used in waterproofing, people are now being given 20-25 years warranty on their waterproofing systems. However, the actual challenges faced by the contractor or the owner is the measurement of the performance of the waterproofing system, or monitoring the performance of such a guaranteed system over a long period of time. Here, these advanced non-destructive instruments become very handy for detecting and pinpointing water leakages. Looking at this grey area, where hardly any application of advanced non-destructive instruments are being carried out in practical fields, we scanned through some modern techniques and instruments that are being used in India and abroad for leakage detection for the general understanding of applicators/contractors so that proper remedial action can be taken.

Some of the major equipment used to locate leaks on building envelopes includes thermal imaging, electronic field vector mapping (EFVM), acoustic data loggers, correlators and humidity sensors, etc. However, out of these, thermal imaging and electronic field vector mapping are most suitable for leakage detection.

Although thermal imaging has been used by many consultants for building diagnosis, its application in leakage

detection is limited only to a few trained professionals. The most important criteria of thermography are the interpretations of the thermal images taken at different times where ambient temperature changes affect the type of thermal images at the same location. Hence understanding the science of infrared radiation of different surfaces subjected to temperature changes is important, and with the help of passive and active thermography, one can interpret the images and identify the source of leakages. Hence though the process is simple, it can become complex unless one understands it completely. Improper understanding may lead to unsuccessful diagnosis of leakage issues, which is what is happening in most cases.

Amongst all the water leakage detection equipments the most accurate is EFVM which can pinpoint the leakage source and can be used for quality control & quality assurance in a membrane waterproofing system thus helping in warranty assurance.

Though the most common application for water leak detection is under raised floors, water can also come from a roof that leaks. Wherever costly equipments are installed, or at data centres, one can install a water leak sensing system by a cable in the ceiling above the data room and suspend the cable from the water pipes of concern, as well as under the raised floor.

Also, facilities and equipment that use water-cooled technology have started to add intelligent cable sensors to provide early warning of leaks that could potentially avoid costly equipment damage and downtime. The cable is installed around the supply and return water lines to continuously monitor for leaks. As a result, they are able to pinpoint the exact location of a leak when it occurs and protect the equipment by triggering an alarm before water reaches the equipment. Leak detection solutions can also be useful in monitoring any area where condensation can build up and cause the growth of mold.

The present issue of ReBuild mainly discusses infrared thermography and EFVM methods for water leakage detection along with some case studies to create awareness about quality control & quality assurance in waterproofing industries.