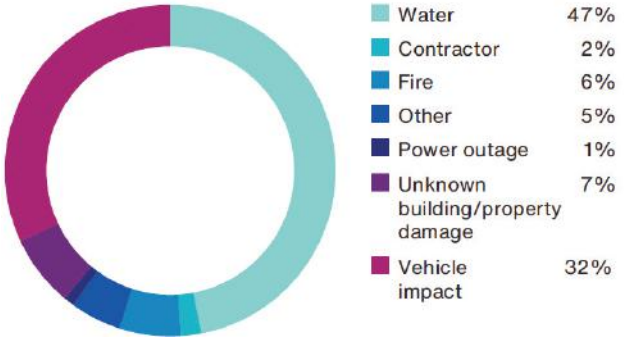
AON

The Effectiveness of Water Leak Detection Devices in Commercial Real Estate Operations

Purpose

Water damage is one of the insurance industry's foremost concerns, in recent years becoming the leading cause of insurance claims in terms of frequency and dollar value. In the commercial real estate industry specifically, water damage claims constitute 47 percent of all insurance claims. See below, Figure 1.

Figure 1: Frequency of Commercial Real Estate Industry Insurance Losses by Claim Type[1]



In response to this increasing problem, several vendors of water damage mitigation technologies have entered the commercial market aiming to assist real estate owners in minimizing water damage losses using a prevention and mitigation approach.

To help clients better gauge the effectiveness of these technologies, Aon Canada's Real Estate Practice conducted an in-depth study of a selected, large real estate corporation's insurance claims history. Aon analyzed the effectiveness of implementing intelligent water prevention technology in eliminating or minimizing water-related damages, by specifically analyzing the financial impact of both leak detection systems and water flow management devices. The following report details the methodology, process and resulting conclusions of this study.

[1]*Information from Eddy Solutions.*

Background

Intelligent Water-Loss Protection Technologies

In conducting our analysis, Aon utilized the following types of water protection systems as a basis for the study: i) water leak detection systems and, ii) water flow management devices. Though there were several vendors of these products in the commercial marketplace that could be used to perform this analysis, for the purposes of this study, Aon selected the Eddy H2O Sensor (leak detection sensor) and the Eddy Link & Shutoff Valve (water flow management device), technologies available from Eddy Solutions, as seen in Figure 2, below.

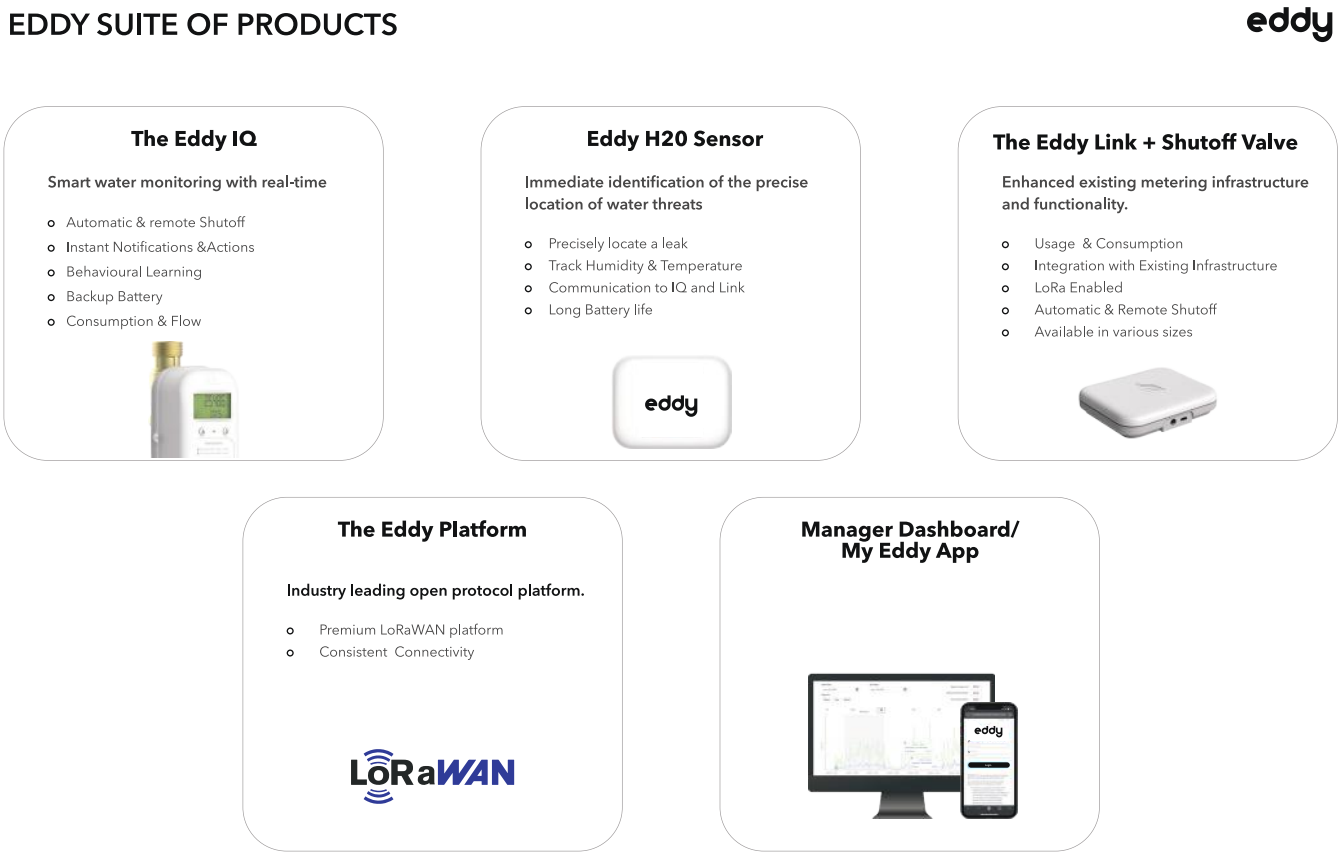
Leak Detection Systems

Leak detection systems are small devices that notify the user when detecting the presence of water (also tracking humidity and/or temperature change), and are typically placed in the areas of a building where water may appear and where it's not supposed to be. In residential buildings, leak detectors can be placed in spaces such as kitchens, washrooms and laundry rooms. In commercial buildings, they can be placed in offices, hallways, lobbies and washrooms. Not only can a leak detector inform the user when it detects the presence of water, but it can also precisely locate the leak if there are multiple sensors installed throughout the building. The user can minimize potential heavy water damages by acting immediately upon receiving a water detection notification, thereby preventing a water leak from flowing for a longer period of time. Leak detectors can also be extremely useful when placed in vacant units or isolated spaces that are not occupied nor frequently inspected. Many water damage claims have occurred resulting from frozen pipes bursting, and having a leak detection system can proactively reduce the financial impact and physical damage incurred, as devices can also warn the user of freezing temperatures.

Water Flow Management Devices

Water flow management devices refers to any device that can measure, control and stop the flow of water. These are intrusive devices that are installed within the piping of a water source that track the flow of water. When faced with any water flow irregularities, such as a spike in water usage or prolonged water usage, it will immediately and automatically shut off the water supply, thereby preventing any further water flow. It must be noted that a drawback for any automatic shutoff device is that the user must

Figure 2: "Eddy H2O Sensor" and "Eddy Link & Shutoff Valve" were the two devices selected in the study.



manually turn the water source back on after any shutoff. This could be problematic if the user is not on-site or does not have the means to restart the water source in a timely manner. To minimize the possibility of accidental shutoffs, some water flow management devices utilize behavioural learning to adapt to each individual building's typical water consumption patterns.

Study Methodology

Aon's methodology in studying the effectiveness of water leak detection systems' ability to mitigate water damage claims revolved around performing an in-depth analysis of a selected Canadian real estate corporation's large portfolio of assets. This portfolio included multi-family residential, office, retail and industrial properties and their accompanying overall water damage insurance claims history over a five-year period.

The following steps outline how effectiveness was determined, as well as how Aon was able to identify the positive financial impacts of water protection systems for each water damage claim.

Firstly, Aon secured access to the selected real estate corporation's complete five-year water damage insurance claims history. Secondly, Aon established an interdisciplinary study team using the professional expertise of colleagues from Aon's claims department, risk engineering department, and real estate client practice. The study team analyzed the claims information to:

1. Determine if leak detection systems and/or water flow management devices would be applicable in affecting each individual water-related claim; and,

2. Estimate to what extent each of those devices would have reduced the damages incurred.

At the start of the project, the study team created a database containing a breakdown of each water damage claim, specifying: the asset class, property location, location code, type of water damage claim, details on incurred loss amounts, insurance deductible applicable, and a description of the circumstances for each loss. To conduct a more comprehensive analysis, details were secured from the real estate corporation's insurance adjuster to extract further information surrounding the loss situation for each claim. The key points of data sought were:

- When the water leak occurred.
- How the water leak was discovered.
- The duration of water flow.
- The source of water.
- The time between discovering the leak and when mitigative actions were actually taken.

Within the database, additional columns were added to summarize each claim and a yes/no applicability column was created for both leak detection systems and water flow management devices.

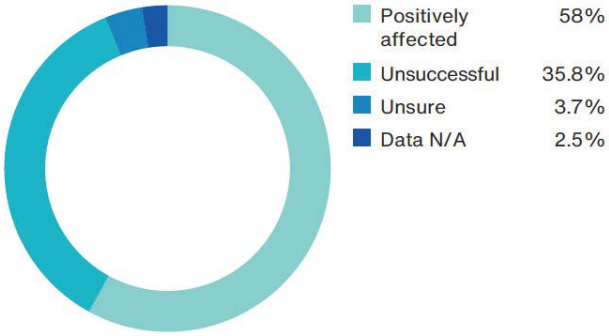
In this way, the data could be sorted to identify how many claims could have been mitigated or prevented by which type of water prevention device (or a combination of both). After gathering and organizing the information in this manner, the Aon study team sought to quantify, in terms of percentage of loss, the effectiveness in reducing the amount of each water damage claim using the two water prevention device types being considered.

Results and Findings

1. After analyzing the selected real estate corporation's total claims history over the five-year period, we identified a total of 243 water-damage related insurance claims to be examined as part of the study. It was found that 58 percent of water damage claims (encompassing 141 claims) could have been positively affected by using water leak detection in reducing loss amounts by at least 5 percent, while 35.8 percent (87 claims) would have been unsuccessful in reducing loss amounts by any notable amount. In the remainder of the examined claims (6.2 percent or 15 claims), success was unsure or could not be determined based upon the available data. See Figure 3 below.

By analyzing 5 year claims history of 243 water-damage related insurance claims it was found that 58% of have been positively affected by using water leak detection in reducing loss amounts.

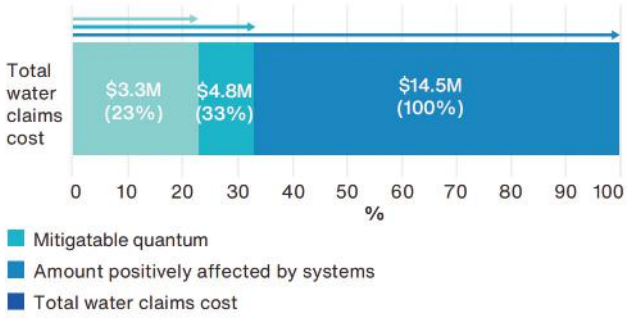
Figure 3: Number of Water Claims Positively Affected by Either LDS and/or WFM Systems



Notes:
1. "LDS" is defined as leak detection systems.
2. "WFM" is defined as water flow management devices.
3. "Positively affected" is defined as claims that would experience at least 5 percent mitigation on the quantum of loss.
4. "Unsuccessful" is defined as claims that LDS and/or WFM systems would have either no effect or less than 5 percent mitigation on the quantum of loss.
5. "Unsure" is defined as claims in which the effect of LDS and/or WFM systems were undetermined.
6. "Data N/A" is defined as claims which did not have sufficient data to come to a conclusion.

2. Aon's study found that 23 percent of the total water. damage amounts incurred could have been successfully mitigated. The 243 total water damage claims amounted to $14.5 million in losses, and our study found that $4.8 million (encompassing 141 claims) of that amount could have been positively affected through implementing water protection systems, to the extent that $3.3 million of that amount would have been successfully mitigated (i.e., avoided). This indicates that although 58 percent (141/243) of the number of total claims could have been positively affected, a lesser amount of only 23 percent ($3.3 million/$14.5 million) of the total amount of the claims incurred would have been actually successfully mitigated. See Figure 4 below.

Figure 4: Effect of LDS and/or WFM Systems



3. It is also important to note that the study found that water protection systems have a greater positive effect in terms of losses successfully mitigated on the largest-valued claims. Out of all 141 positively affected water damage claims, 106 claims were individually valued around $10,000 or less, totalling approximately $216,000 in damages. This value is a rather nominal amount compared to the $14.5 million of total water claims examined. In these low-valued claims ($10,000 or less), water protection systems could not have much of an overall financial impact, as the loss damage amounts avoided would be rather minimal.
For this reason, our analysis focused on the remaining 35 largest-valued claims that would have been most positively affected in terms of dollar savings by the water protection systems. As seen in Figure 5, it is apparent that as the dollar value of each claim increases, so does the effectiveness of the loss mitigation. This suggests that leak detection systems and water flow management devices are most effective in protecting against larger water loss claims.

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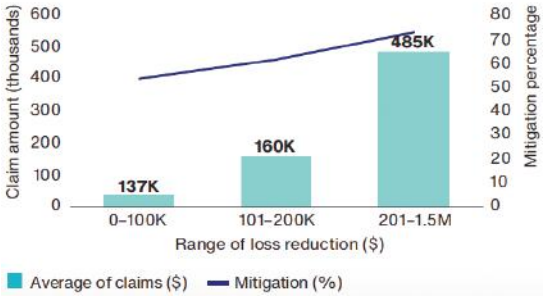
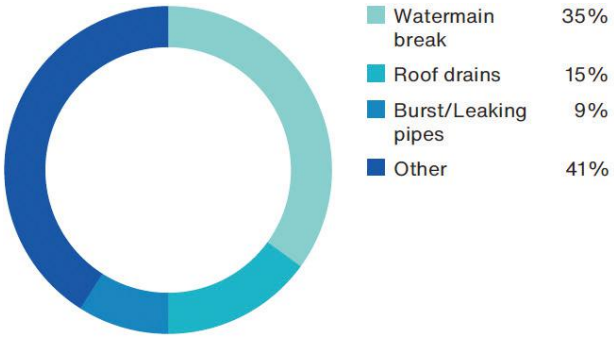
Figure 5: Average of Positively Affected Water Claims vs. Average Mitigation Percentage



It must be mentioned that this study and its accompanying analysis examined the effectiveness of leak detection technologies from only the pure costs from a physical loss damage perspective. It did not account for the additional reduction and hence savings of intangible costs and expenses, such as management time and effort, employee stress, corporate reputational damages suffered, opportunity costs of not working on other crucial matters and any adverse effects on tenant operations.

4. In many of the water damage claims, where it was determined that water protection systems would have had no effect, the source of water damage was often out of the real estate organization's control. For instance, when the cause originated from a municipal watermain or where the damage occurred from external causes outside the control of the real estate organization. As seen in Figure 6 below, the breakdown of the leading causes for the water damage claims analyzed, revealed that the majority of the number of claims were caused from events and perils outside of the building structure itself.

Figure 6: Leading Causes for Water-Related Damages



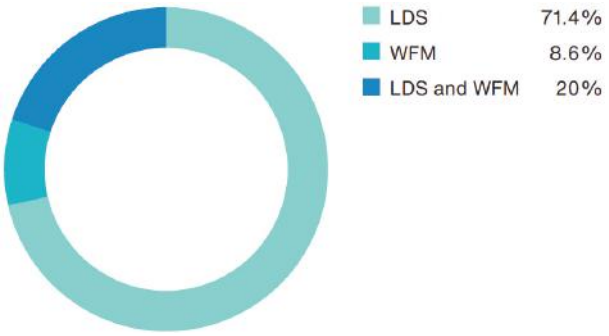
Notes:
1. Watermain breaks occur external to the building.
2. Roof drains occur internal to the building.
3. Burst/Leaking pipes occur internal to the building.

5. Leak detection systems and water flow management devices were found to be highly effective where the source of water giving rise to the claim can be controlled and monitored. By giving the user an early warning and enabling quick reaction, the extent of damages can be greatly reduced. The water flow management automatic shutoff device provides best protection when these systems are unattended. This results in a significantly reduced spread of water, curbing incurred damages substantially. As a result, water protection systems are most effective in reducing

6. Additionally, leak detection and water flow management systems were also found to be highly effective when used in buildings that were vacant for extended periods of time. For example, in one of the water damage claims studied, a water line burst due to freezing but was not shut off for 45 minutes resulting in $600,000 in damages to five floors below the water source floor. In this case, the system would have notified the user and the water flow would have been shut off automatically. Our study found that this would have resulted in mitigating an estimated $540,000 of the damages, or about 90% of the actual costs incurred.

7. When comparing the two systems, in situations where water damage claims were positively affected in terms of losses incurred, Aon's study determined that leak detection systems would have been more frequently effective in reducing water damages than water flow management devices. This breakdown of system types used in positively affected claims is seen in Figure 7 below.

Figure 7: Distribution of Systems Used in Cases Where Quantum of Loss is Positively Affected



Notes:
1. "Positively affected" is defined as claims that would experience at least 5 percent mitigation on the quantum of loss.
2. "LDS and WFM" is defined as a combination of using both LDS and WFM systems.

Conclusions

Aon's study on the effectiveness of utilizing leak detection systems and water flow management devices for this particular large commercial real estate operation, came to the following specific conclusions:

1. Water damage protection systems would have positively affected, to some notable extent, 58 percent of the total number of water loss claims incurred (frequency).

2. Water damage protection systems would have reduced total water damage losses (severity) incurred by 23 percent.

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It also came to the following more general conclusions:

1. As the value of the water damage claim increases, so does the mitigation effectiveness in reducing loss amounts by utilizing water protection systems.

2. The majority of the number of water damage claims were caused from factors arising outside the physical space of a given building.

3. Water protection devices are most effective in buildings where the user has full control of the water systems.

4. Water protection systems are very effective when used in buildings that have been vacant for a period of time or have inaccessible parts.

5. Of the two types of water devices examined, leak detection systems were found to be more frequently effective in reducing claim damage amounts positively, moreso than water flow devices.

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In summary, Aon's study findings concluded that the proper installation, monitoring and use of water leak detection technologies can significantly reduce the total damages incurred for insurance water damage claims for owners of commercial real estate operations.

Disclaimer
Aon does not endorse the products considered by this study nor was Aon compensated in any way by the vendors of the product technologies considered in this study.