



JOB SITE
INSIGHTS™

CASE STUDIES

CASE STUDY

PROVEN ROI – PREVENTING DAMAGES & COSTLY REWORK

66-STORY CONDOMINIUM PROJECT

Temperature and humidity sensors were installed in each of the building's 315 units to monitor temperature and humidity during construction. The reusable sensors were not removed following the project's completion and continue to operate at the developer's request.

Throughout construction, Job Site Insights™ (JSI™) alerted construction teams to temperature and humidity deviations (from acceptable ranges) that could impair hardwood finishing, material quality, and lead to costly rework and extended project completion. Continuous temperature monitoring also reduced the project's energy consumption, saved heating costs and minimized the construction's carbon footprint. **Continuous water leak monitoring prevented \$104,000 in potential water damage.**



\$40k

in sensors and connectivity using JSI

ENABLED



\$180k

Carbon-based fuel savings



\$69k

Electrical energy savings



\$68k

reduced hardwood damage rework costs



\$104k

rework avoidance water/leak damage

10 TIMES return on investment

CASE STUDY

JSI SCALABILITY PROTECTS AGAINST DAMAGES

LARGE HOSPITAL

During construction, JSI protected a 1.2 million square foot hospital with 32 departments from potential damage. **Temperature sensors were deployed to 100+ areas of the construction site** where freezing temperatures could create extensive and costly damage. JSI's scalability protects projects of any size or complexity.

On a weekend morning, a job site security guard received a JSI temperature threshold alert directing the guard to the hospital's auditorium – where an unfinished wall panel envelope exposed block walls to freezing temperatures. The temporary heater had failed. With insufficient heating, water pipes near these walls were susceptible to freezing; a broken water pipe would damage the finished auditorium's flooring and drywall. An adjacent mechanical room containing a bus-duct would also have incurred water damage.

The projected loss from a broken water pipe and the resulting water damage in the hospital's auditorium was **between \$300,000 and \$1,000,000.**

CASE STUDY

SAFEGUARDING CANADIAN HERITAGE ART

MULTI YEAR RESTORATION PROJECT, HISTORIC BUILDING

The current restoration of an iconic building involves the reconstruction of 4 buildings connected by a 2-storey podium. The construction contract requires specific measures to safeguard the building's heritage art collection.

Sensors installed around the art pieces continually report temperature and humidity levels. Threshold alerting informs the general contractor and the art's custodians of any deviations that could potentially damage the pieces.

Repairing damages to the artwork resulting from adverse temperature/humidity conditions would incur significant costs and damage claims. JSI is entrusted to protect these invaluable heritage items.

CASE STUDY

CONCRETE SENSORS SAVING SCHEDULE & COSTS, REDUCING SAFETY RISK EXPOSURE

55-STORY MULTI-USE HOTEL/ CONDOMINIUM TOWER

Early concrete formwork stripping was critical to meeting the project's aggressive schedule. JSI wireless concrete sensors, deployed in-situ, provided real-time temperature, humidity and maturity data ensuring the installed concrete met design/strength specifications and enabling formwork stripping to occur as soon as possible.

SCHEDULE AND COST SAVINGS

Concrete sensors eliminate all wait times associated with traditional concrete strength testing and third-party testing agencies. For all vertical and horizontal concrete pours, 20 hours per floor were saved (1,100 hours total), returning 45 days to the project's schedule. These savings are based on a tester making one trip to site. The time accounts for two visits to site before an acceptable test result is met, as well as two additional hours of vertical travel logistics per trip. Including the cost of concrete sensors, concrete testing costs were reduced by 50% compared to third-party testing. ➤



ELIMINATING RISK EXPOSURE

Third-party testing requires testing personnel to attend the job site; concrete sensors reduce/eliminate the person-hours these personnel spend on an active job site. These personnel are often unfamiliar with job site protocols and safety practices. This potential safety liability is compounded when testers lift heavy concrete test cylinders. JSI concrete sensors reduce a general contractor's exposure to this safety risk, as well as the risks associated with crane-hoisting the concrete test cylinders.

CASE STUDY

PREVENTING WATER INFRASTRUCTURE FROM FREEZING RELIGIOUS TEMPLE

During winter construction of a \$35 million temple, JSI temperature monitoring prevented significant damage to the temple's water infrastructure. On a Saturday evening, a project coordinator received a JSI temperature alert that a 10°C minimum temperature threshold was reached.

Arriving on site, the coordinator discovered a subtrade had removed the insulation from the room's entry door and the room was quickly approaching 0°C. After replacing the insulation, the coordinator remained on site until the room's temperature returned to its acceptable level, preventing the building's water and sprinkler risers from freezing.

Had the water and sprinkler risers frozen, **estimated remediation costs were \$15,000.** Additionally, adjacent mechanical room equipment would have likely incurred water damage.

As noted by the project's quality coordinator: "We were able to save the building's water riser and sprinkler riser from freezing by having a temperature sensor in the water entry room. That's

both schedule saved and rework we were able to avoid thanks to the alert."

The Navigant Construction Forum™ research paper The Impact of Rework on Construction & Some Practical Remedies concludes:

- **"Average rework on projects can cost between 7.25% and 10.89% of total construction cost** (when both direct and indirect costs are included) and **can cause an increase in the schedule (project delay) of approximately 9.8%** of the planned project time."

The paper further notes:

- "...rework can cause substantial schedule growth on a project which, in turn, can result in substantial delay costs. Such delay costs, under most contracts, are classified as contractor caused delay and as such are typically not recoverable costs. These delay costs include extended home office and field office overhead, extended labor and equipment costs and the **payment of either liquidated or actual damages due to contractor caused delay.**"

CASE STUDY

PROTECTING CRITICAL ASSETS FROM WATER DAMAGE 35-STORY COMMERCIAL OFFICE TOWER

During construction, a hose connection in the tower's pump room broke. Sensors detected water on the pump room's floor and JSI alerted site personnel to a water leak; the water supply was quickly shut off and extensive damages were prevented. Photographs taken by the site team following the alert showed significant waters pools on the pump room's floor.

The pump room contains the building's fire suppression system which includes fire booster pumps, domestic water booster pumps, pump controllers and sprinkler water sources. The

equipment would require replacement if damaged by water; **the replacement cost of these assets exceed \$300,000.**

JSI provides water detection, water flow metering and automated water valve shut off when a leak is detected. Protecting job sites and as-built structures from water damage mitigates one of the industry's most expensive damage claims.

- For a large Canadian general contractor, **55% of loss claims resulted from water damage** over a ten-year period; the **average claim size was \$307,000.**
- Various industry studies indicate water damage claims are numerous and costly. According to an AGCS analysis, **water damage is the third most common insurance claim** based on an analysis of 470,000 claims received by the global insurance industry from 2013-2018
- In Canada, the AGCS study found water damage is a leading source of all insurance claims:

BY VALUE OF CLAIMS*

23%
Fire/Explosion

12%
Faulty Workmanship/
Maintenance

8%
Aviation
Collision/Crash

7%
Water Damage

7%
Storm

43%
Other

BY NUMBER OF CLAIMS*

19%
Water Damage

17%
Faulty Workmanship/
Maintenance

16%
Automobile
Collision/Crash

5%
Slips and falls

5%
Defective Products

38%
Other

This is how JSI transforms construction into smart construction, real-time data into real-world results.



* Source: Allianz Global Corporate & Speciality. Based on analysis of 41,942 insurance industry claims worth approximately €2.7bn between July 2013, and July 2018.