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Professional infrared survey can affordably and quickly pinpoint building performance problems

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Evaluating building envelope performance is quickly becoming essential to proper management of today's facilities. Several factors drive this trend: rising energy costs, government regulations, new construction techniques and materials, concerns about occupant health, and escalating litigation. Specific issues, such as moisture damage, frozen pipes, ice dams, occupant discomfort and high heating costs also prompt smart managers to seek professional building envelope analysis.

Substantial money and effort is often wasted in attempts to address a building's performance problems, when a professional infrared survey could quickly and affordably provide the information needed to guide cost-effective repairs.

But what is a "building envelope"? Generally, it includes the roof, ceiling, floor and wall assemblies, windows and skylights, slab edges, and below-grade walls. Infrared thermography is the only technology able to deliver the 'big picture' of the building envelope as a complete system.

Occupant Comfort

We recently tested a large office building in New York built with insulated metal panels. Although the panels performed well, gaskets between panels allowed so much air infiltration that it was impossible to maintain a comfortable interior temperature. Infrared testing revealed significant "stack effect" issues; warm air was escaping near the top of the building while cold air infiltrated at the lower levels.

At another project, the attic of a 150-year-old college building was converted into office space. After renovation, the entire floor experienced chilly interior temperatures, frozen pipes, and water damage. Infrared testing revealed poorly installed insulation in the walls and ceilings and an inadequate exterior air barrier. Our test findings were used to guide a successful effort to correct the problems.

Moisture and Mold

Prevention is always the best strategy when dealing with moisture and mold. While infrared testing does not directly identify mold, it can pinpoint the moisture that sets the stage for mold growth in walls and roofs. Early identification of water-damaged areas is the cheapest and most effective step in any comprehensive plan for mold prevention and remediation.

Sometimes moisture infiltration begins in the roof system. A combination of roof leaks and high interior humidity recently created a serious mold bloom throughout large areas of a Vermont school district's facility. After spending $4.5 million on mold remediation and renovation at the elementary school, the district moved into proactive mode. An infrared inspection was ordered to locate leaks and potential mold sites in the low-slope roof of the high school. In total, 39 distinct areas of water-damaged roofing were identified. The school district is now repairing these areas to prevent further mold infestation.

Catastrophic Failures

Non-destructive testing can be invaluable when trying to assess damage and plan repairs following catastrophic facility failure. Several years ago, the attic sprinkler system of a wood-framed, fiberglass-insulated office building burst during an especially cold weekend, inundating the entire building.

Locating and mitigating moisture problems in the interior was relatively easy, but a big question remained; how much of the approximately 10,000 s/f of exterior wall system had been compromised?

Rather than completely stripping the drywall or randomly checking spots with a moisture meter, infrared thermography was employed to locate moisture damage in the exterior wall. Amazingly, despite the severe damage to the interior, only two small areas of moisture-damaged insulation were found in the exterior walls. This finding saved the owners tens of thousands of dollars in demolition and construction costs.

Post-Construction QC

Newly constructed or renovated buildings can have hidden design and construction flaws that create serious problems down the road. Our certified thermographers recently performed a quality control inspection of new construction on a college campus. Over fifty significant problem areas were identified, including poorly installed insulation, cold air infiltration through inadequate air and vapor barriers, and cold air leakage through poorly performing windows.

Dispute Resolution

When disputes arise in the course of a building project, it's a huge advantage to have an unbiased third party assess the situation. Professional infrared testing is often the best option because it provides an inherently objective 'big picture' of both the condition and performance of the facility. Identifying and isolating problems can help previously warring parties agree to work cooperatively on quick and cost-effective solutions.

Conclusion

Today's emphasis on increased insulation and air tightness can improve occupant comfort while substantially reducing energy consumption, but it also makes the performance of the building envelope much more critical to the health of the structure than in days past.

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