

CASE STUDY—CHARLOTTE, NC



- EIFS OVER CMU CONSTRUCTION WITH CURTAIN WALL WINDOW STACKS
- MOISTURE PENETRATION THROUGH ORIGINAL 1970'S WINDOWS
- PURCHASING CLIENT CONCERNED ABOUT EIFS APPLIED IN 1990 AND GENERAL BUILDING ENVELOPE PERFORMANCE



Open wall investigation revealed long term moisture migration into the window stacks. Moisture flowed down the stack and entered the interior working area at window heads.



It was determined the EIFS cladding had been installed over the exterior window sill blocking the window weeps. This forced moisture inward which flowed down the curtain wall.

Problem: Client is concerned about possible issues related to the barrier EIFS cladding, which is 17 years old.

Solution: MoistureFree Commercial Services investigation determined that the EIFS had a remaining useful service life of 20 years, provided that some maintenance and limited repairs were made. However, a serious moisture concern with the window systems was discovered, which had been affecting the building for many years.

Results: The purchasing client was able to evaluate the actual moisture problems, which were related to the window systems and not the EIFS.

CASE STUDY—PRINCETON, NJ



- 46 BUILDING COMPLEX OF HIGH END TOWN HOMES
- MIX OF BARRIER AND DRAINABLE EIFS OVER LIGHT WOOD FRAME
- ATTORNEYS CONVINCED HOMEOWNERS ASSOCIATION THAT THE EIFS MUST BE REMOVED AT AN ESTIMATED COST OF \$18 MILLION



High moisture locations associated with windows occurred at a frequency nearly ten times less than average. Windows that did leak could be easily modified.



Failed flashing locations were the only significant location of moisture and damage. These limited areas did require repair and modification, but did not justify complete recladding.

Problem: Multiple defendants were being sued for product defect, installation, windows and other systems of the buildings. Defendants needed evidence and expert data to defend the satisfactory condition of the buildings.

Solution: MoistureFree Commercial Services was hired to provide expert witness services and analysis of the buildings. A thorough investigation of the buildings revealed that they were in excellent condition with the exception of limited flashing areas that required modification. MoistureFree's extensive database of more than 18,000 buildings and over 1.5 million data points provided solid evidence to back up the opinion that the buildings have a reliable cladding system. MoistureFree Commercial Services provided the estimated modification costs for the facility and backed the proposal with the guaranteed issuance of the MoistureFree Warranty following remediation by MFCS.

Results: Litigation is pending. However, the defendants now have a highly credible source through MoistureFree Commercial Services to refute the claims by the homeowners association that extensive failures justify recladding of the entire complex.

Projected Savings For Client = potentially \$15.5 million

CASE STUDY—GOSHEN, NY



- ASSISTED LIVING FACILITY WITH EIFS AND SPLIT BLOCK EXTERIOR
- MOISTURE PENETRATION CAUSED BY MULTIPLE SOURCES THROUGHOUT THE COMPLEX
- DIRECT MOISTURE PENETRATION TO THE INTERIOR LIVING SPACE AND IAQ ISSUES AFFECTING TENENTS



Spray rack and negative pressure testing of the windows revealed chronic problems in the windows design.



Interior damage to the steel stud walls was apparent in some areas of the facility. MoistureFree repaired these areas and eliminated the source of the IAQ issues.

Problem: Multiple attempts had been made to correct the moisture problems at this facility at the cost of hundreds of thousands of dollars. The engineering companies involved in the remediation were unsuccessful at determining the root cause of the failures and the problems throughout the buildings continued for several years.

Solution: MFS was contracted to determine the source of the moisture problems, engineer solutions to those problems and install those solutions on the facility. Extensive testing revealed previously undetected sources of moisture entry into the building. Windows, doors, decks, EIFS/block intersections, parapet caps and other flashings were all moisture sources. Window/wall assemblies were sprayed and pressure tested. Remediation designs were refined from the testing and full elevations of the buildings were fitted with the modifications.

Results: Following MFS's remediation, only one leak occurred out of more than 470 locations. The cost of the testing, remediation and warranty was less than 20% of the cost of other proposed solutions, compared to other remediation options.

Projected Savings For Client = \$1.8 million

CASE STUDY—ST. LOUIS, MO



- 1927 MASS WALL CONSTRUCTION CONVERTED TO CONDOMINIUMS IN 2002
- DIRECT WATER PENETRATION THROUGH ALL OF THE NEW WINDOW AND DOOR SYSTEMS
- CONDO UNITS WERE UNMARKETABLE DUE TO MOISTURE ISSUES



All of the door systems failed the spray rack test (without negative pressure) within 30 seconds.



Windows failed through mullions, miters, and glazing locations.

Problem: Over a period of two years, the window/door manufacturer, installer, and third-party had made numerous attempts to repair and modify the failing door and window systems with no success. Moisture damage to floor systems, failed remediation costs, delays in sales, and other expenses totaled more than \$300,000. Complete replacement of the door and window systems was proposed at an additional cost of more than \$700,000.

Solution: MoistureFree Commercial Services was contracted to analyze the moisture problems in the building and determine if remediation was possible or if full door and window replacement would be required. MoistureFree conducted a series of tests on both the door and window systems and determined that modifications might be possible to manage the moisture intrusion. A solution was engineered for the door units to actively drain any moisture penetration through the door construction to the exterior through drainable threshold assemblies. The window systems were retrofitted with MoistureFree's DamSill™ system. The solutions were installed and tested with excellent results.

Results: MoistureFree was contracted to modify all of the door and window systems. No failures have occurred since the modification. Nearly all of the condominium units were sold within six months of the successful remediation by MoistureFree.

Projected Savings For Client = \$602,000

CASE STUDY—CLEVELAND, OH



- CONOMINIUM CONVERSION OF MASS WALL WAREHOUSE
- MOISTURE PENETRATION THROUGH FAULTY WINDOW DESIGN/INSTALLATION
- DIRECT MOISTURE PENETRATION TO THE INTERIOR LIVING SPACE AND IAQ ISSUES AFFECTING TENENTS



Forensic investigation revealed lack of flashing at the window sill. Moisture penetration through the window drained directly into an interior wall and created IAQ issues in many units.



The interior wall under the windows received most of the moisture from the windows causing damage to the steel stud and interior surfaces.

Problem: Since renovation to condominiums, this facility experienced chronic leaking through nearly all the windows systems. Multiple efforts to remediate the problem proved unsuccessful. IAQ issues were a concern in many of the units.

Solution: MoistureFree Commercial Services determine the source of the moisture problem related to the absence of a flashing elements and poor design of the window system itself. Retrofitting of the windows was possible without removal of the windows using MFCS's patented systems.

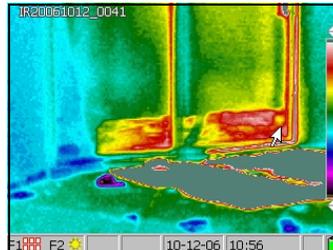
Results: Litigation is ongoing, but MoistureFree Commercial Services has provided a remediation option that resolves the problem at a fraction of the cost of window replacement and is backed by the MoistureFree Warranty program.

Projected Savings For Client = \$3.3 million

CASE STUDY—TALLAHASSEE, FL



- 136,000 SQ. FT., 14 BUILIND FACILITY. PORTLAND BASED STUCCO ON CMU.
- WATER PENETRATION THROUGH ALL OF THE WINDOW, DOOR AND DECK SYSTEMS
- OWNER HAD TO RESOLVE THE PROBLEM OR DEMOLISH THE BUILDINGS AND RE-BUILD



Infrared imaging helped reveal the multiple sources of moisture intrusion into the units. Hollow-core cantilevered concrete decks were a direct moisture source.



Retrofitting of the moisture source locations proved successful. Chronic leak areas were eliminated for the first time since the facility was built.

Problem: Over the course of more than 30 years, these building had experienced moisture problems. Numerous attempts to resolve the moisture problems had been attempted. Within the previous two years, several hundred thousand dollars were wasted on attempts at retrofitting. All of these attempts failed and some cases made the problem worse.

Solution: MoistureFree Commercial Services conducted thorough testing of the facility to determine the exact cause of the problem. It was determined that the previous remediation efforts were being made to the face of the wall systems, which was porous and allowed the moisture to bypass the modifications. MFCS successfully installed and tested active drainage modifications to the source locations, which controlled the leaks.

Results: MoistureFree Commercial Service's successfully provided the building owners an option to effectively modify a facility that otherwise would have been demolished.

Projected Savings For Client = \$2.7 million