TECHNICAL INFORMATION PAPER SERIES: PREVENTING WATER DAMAGE DURING CONSTRUCTION

TAKE THESE PROACTIVE STEPS TO AVOID WATER DAMAGE TO YOUR CONSTRUCTION PROJECTS.

While fire is the major cause of damage to buildings under construction, water damage claims were the second most frequent property loss in 2010.[1] Water damage can also lead to mold growth, costly litigation and financial loss.

In addition to direct costs associated with cleanup, material replacement, equipment repair and mold remediation, water damage incidents may lead to significant indirect costs associated with construction delays and business interruptions. Many construction contracts include liquidated damage provisions in the event a project is delayed past a predetermined date.

Construction delays, especially those near the end of a project, can result in loss of revenues as well as increased taxes, interest expense, legal fees, inspection fees and marketing expenses.

One strategy to help ensure a successful project: **Take proactive measures to avoid water damage and be fully prepared to take immediate action in the event of a water intrusion.**

WATER DAMAGE PREVENTION PLAN

A water damage prevention plan (WDPP) is generally job-specific, in place prior to the start of construction, documented in writing, available to all contractors working on the job, and included in employee orientation. It should be re-evaluated as conditions change or following any water intrusion incident. The following areas should be considered when designing a WDPP:

Pre-Planning

Proper planning is more than just ensuring that the building envelope is weather tight before allowing interior trades to begin work.

- In the design stage, it involves locating mechanical and electrical equipment away from areas where water may collect, such as basements. Building plans should locate water lines in heated areas, away from crawl spaces or closets to avoid frozen water lines.

continued

THE HARTFORD

- Site development or grading plans should divert water accumulations from the construction area. Connections to permanent sewer and storm water systems should be made before building construction begins.
- Water usually enters the exterior skin of a building at transition points such as windows. The design and installation of moisture and air infiltration barriers or retarders should allow water to exit the exterior wall systems and ensure that external walls have appropriate drainage planes behind them. Appropriate vapor barriers are critical.
- Building plans should include waterproofing designs to all roofs, foundations, windows, doors, gutters, and drainage systems and specify the types of flashing, waterproofing components, moisture barriers and retarders to be used.

Job Responsibilities

Supervisory personnel are typically responsible for implementing all water intrusion prevention methods, such as work practice/administrative controls and engineering controls (i.e. water leak detection systems). A WDPP often further:

- Includes clearly defined responsibilities for supervisors, employees and subcontractors
- Identifies personnel responsible for monitoring weather forecasts and properly securing the site in expectation of inclement weather
- Identifies personnel having authority to shut down, delay installations or stop construction in anticipation of a natural event such as heavy rainfall, windstorm, flooding or hurricane
- Includes personnel responsible for work scheduling, material deliveries and storage, worksite inspections, and employee training designed to minimize water damage loss
- Has an approval process for scheduling water pressure testing of sprinkler or plumbing lines

Deliveries and Storage

Construction materials vary in their susceptibility to water damage. The WDPP should identify moisture sensitive building materials; specify when they are to be received; and where they will be stored prior to installation. Manufacturers and suppliers can help you determine which materials are susceptible to moisture damage. Site supervisors and purchasing personnel should collaborate to determine the optimal delivery schedule for these materials.

Inspections and Surveillance

The WDPP should identify personnel to monitor the site during the workday and to ensure the building is weather tight at the end of each work shift.

It should address protection during the night and on weekends. Security patrols should be responsible for detecting and responding to water intrusion incidents or inadequately heated locations in the same manner as a potential security threat.

SOURCES OF WATER DAMAGE

Exterior Water Sources		Interior Water Sources
• Adjacent properties • Exterior plumbing (city water supply) • Foundation • Groundwater • Irrigation systems	• Rain, ice dams • Roofs and roof drains • Siding • Septic systems • Waterproofing • Windows and doors	• Plumbing (equipment, piping, drains, fixtures, sump pumps) • Fire sprinklers (piping, sprinkler heads, stand pipes, control boxes) • Mechanical systems (heaters, air handlers, evaporators, chillers, tanks, boilers, piping, refrigerated lines, reservoirs) • Wet areas (shower, bath, laundry, water closet) • Condensation resulting from moisture-laden air in close proximity to cold surfaces

Common causes of water damage during construction include:

- Improper installation of weatherproofing, waterproofing and moisture barrier systems on the exterior skin of a building
- Poorly glued connections on plastic pipes or improperly sweated copper pipe connections

Supervisors should ensure that all weatherproofing/waterproofing installations adhere to the building plans, manufacturers' specifications, industry standards, and all relevant building codes. The WDPP should include a quality control plan for plumbing connections and fittings such as marking each connection with a permanent marker. The plan should also include the fire sprinkler system.

Worksite inspections should verify that:

- Water accumulations from rain and groundwater are not migrating into the building
- All door and window openings are covered at the end of each work shift and prior to inclement weather
- Water lines and mechanical equipment are protected from freezing
- Sprinkler or plumbing lines that are pressure tested with water are drained immediately following the test
- Standpipe valves are closed
- Roof drains are not blocked with leaves or debris
- Sink drains are not clogged
- Storage areas are dry and well ventilated
- Materials are raised off the floor by pallets for storage

Controls

The WDPP often outlines preventative measures to minimize the risk of water damage such as an administrative policy to shut off the domestic water supply during off-hours. Supervisory personnel should verify that no trades will be working during off-hours before shutting off the water supply. In addition, they must ensure that the domestic water line doesn't provide water to any operating mechanical system that requires a constant water source. Other preventative procedures include:

- Providing a secondary power source (i.e. generator) when using sump pumps or other water pumping systems
- Testing sprinkler and plumbing systems with air pressure to identify system leaks before charging with water
- Sealing leading edges of roofing materials at the end of each day to prevent storm water from getting under an incomplete roofing membrane
- Providing heat during the winter in buildings with charged water lines or standpipes to protect from freezing
- Leaving a gap of at least 1/2" between the drywall and the floor to minimize water contact in the event floors become wet

Many leak detection systems are available to help prevent water damage. Many commercial water flow detection systems are completely non-intrusive (no cutting of pipe to install) and easy to program. Passive leak detectors monitor water flow and sound an alarm (local or connected to a centrally monitored system) when water starts to flow and the system is armed during off hours. Active leak detectors not only generate an alarm, but can also prevent water leaks by automatically shutting off the water supply. The WDPP can list the leak detection systems used on-site, identify supervisory personnel responsible for their use, and refer to the operating guidelines for each system.

Training

Employee orientation training generally includes an overview of the WDPP as well as the site-specific engineering and administrative controls to help prevent water damage. Employees must understand their role in helping to monitor the workplace and reporting any potential water intrusion. Training should be reinforced during regularly scheduled "toolbox talks."

Off-site Locations

Ideally, moisture sensitive materials will be delivered "just in time" for use. That's not always feasible, so off-site locations or trailers are often used for storage. The longer materials and supplies remain in storage, the greater their exposure to water damage. Potential exposures at off-site storage locations should be considered in the WDPP.

Transportation of moisture sensitive materials to the job site is another potential cause of water damage. Moisture sensitive materials should be properly sealed and/or covered to avoid water damage in transit. During inclement weather, unloading of these materials should be delayed.

Reporting

The WDPP should outline water intrusion reporting procedures and include personnel responsible for implementing them. All employees, subcontractors and security personnel on the site should be provided with 24/7 emergency contact information. Reports of water intrusion should be treated as an emergency and with the same urgency as a fire or security breach. Immediate response and cleanup within 24 hours of an incident typically results in significant cost savings compared to a delayed response. All reports of water intrusion should be investigated and results documented in writing. Photographs of damaged areas should be included.

Risk Transfer

In addition to provisions for planning, prevention, training and response, the WDPP should include risk transfer and contract management provisions. Since subcontractors are often hired to install building components in moisture sensitive

areas, proactive risk transfer methods and hold harmless language should be considered in every subcontractor agreement.

Renovations

Renovation projects and new construction with partial occupancies (i.e. tenant build-outs) involve unique challenges in preventing water damage. Engineering and administrative controls that work well in new construction projects must be modified whenever a building, or a portion of a building, is occupied during construction.

The WDPP for renovation projects and/or buildings that will be occupied during construction should consider:

- Requirements for site inspection prior to construction and documentation (i.e. photos) of any wet building materials or signs of mold growth
- Procedures to ensure that the domestic water line doesn't supply occupied portions of the building before considering shut off during off-hours

- Requirements for installation of water flow leak detectors on water lines that supply unoccupied construction zones. When water lines supply both construction and occupied zones, moisture sensors should be used, instead of water flow leak detectors
- Procedures to receive and address water intrusion concerns from building occupants during construction
- A plan for relocating occupants in the event of a water intrusion in occupied areas

ABOUT THE HARTFORD'S MARINE PRACTICE

The Hartford's Marine Practice is a leading provider of innovative inland marine, ocean marine and property insurance products that safeguard property enabling businesses to achieve long-term financial stability and success. We are Moving Commerce Ahead® by providing creative, competitive and distinctive insurance products and services to our customers across the industries we service, including the transportation, manufacturing, construction and renewable energy sectors.

To learn more about our appetite and capabilities visit us at: thehartford.com/marine.

CONTACT YOUR AGENT OR RISK ENGINEERING CONSULTANT FROM THE HARTFORD. OR VISIT US ONLINE AT THEHARTFORD.COM/RISKENGINEERING.

[1] Source Xactware 2010 Property Report

THE HARTFORD

Business Insurance
Employee Benefits
Auto
Home