Business Issues

Overview

This section provides an introduction to some of the business issues when starting a commercial inspection division. Areas to be covered include —

- Why get into commercial inspections
- The TEAM approach
- Who are your clients and why do they want an inspection
- What buildings get inspected

Should you get into commercial inspections?

Commercial inspections are not for everybody. It's a different way of doing business. For those that decide to get into the business, it can be very rewarding, both professionally and financially. However, it's different from home inspections. If you are a "control freak," have trouble with people management or are chronically disorganized, this may not be for you.

Eight reasons to get into commercial inspections

1. **It's the kind of inspection you wish your residential inspections were.** For a residential inspection, the client is emotionally attached to the deal. The client is has to be treated carefully. When the client moves into the house and finds some minor detail that you "obviously overlooked" they take it personally.

   Commercial inspections, on the other hand, are the opposite. The client is often very professional, perhaps an investor or representative of a group of investors. Clients just want to know the "bottom line." There is nothing emotional or personal about the deal. Many commercial inspectors report that they have never had a callback or complaint.

2. **There is good money in commercial inspections.** Hour for hour, we find that our commercial division can earn somewhat more than our residential division.

3. **You already have many of the skills you will need.** While it is true that commercial buildings are not just big houses, the knowledge that you already have will put you well ahead of someone getting into commercial inspections from scratch. In fact, if you use the TEAM approach we advocate, you could start doing commercial inspections in about a week.

4. **You already have the business machinery in place.** You probably have contacts in the real estate industry. Many of the people that you work with will have contacts in the commercial sector.

5. **The market is just getting established.** There are fewer commercial inspectors out there, per building. In addition, the concept of having a professional inspection done on a commercial building is relatively new. All in all, commercial inspections are growing.

6. **Repeat business is typical rather than the exception.** Your clients in the commercial inspection business tend to be investors who buy and sell buildings frequently.

Rusted steel deck on the underside. This would be observed from the interior of the building (remove a ceiling tile). This may be due to –

- a roof leak (if rust is localized)
- phenolic foam insulation used without a proper vapor barrier. If condensation forms in the roof assembly or if there is a roof leak, the moisture mixes with the phenolic insulation and can become corrosive. In extreme cases, complete reroofing, including the steel roof decking, has been necessary. Even if there are no signs of corrosion and you suspect there is phenolic insulation, suggest further investigation, such as cut tests. Cut tests will verify the insulation type, verify the presence of a vapor barrier and spot-check the deck for corrosion on the top surface.

Missing grease tray. At kitchen exhaust fans, grease trays are required to protect the roof membrane from grease residue. This residue can damage the membrane.

Clogged drains. Pine needles and other debris can clog drain strainers, leading to poor drainage and ponding. Also check to make sure that all drains *have* strainers and that the openings in the strainers are not large enough to allow the gravel through.

Ponding. This condition is defined as water remaining on the roof 48 hours after a rain. Drains and drain lines are often installed in walls or at columns, which are commonly the high points of the roof, leaving water to settle into the low spots. Water sitting on the roof for extended periods of time can lead to vegetation growth on the roof. Pinholes leaks can develop into a significant problem if hundreds of gallons of water are sitting on the roof and excessive water weight can lead to structural problems.

Loose seams. Sheet membranes, such as modified bitumen, EPDM and PVC, are especially vulnerable to leakage at poorly secured seams. Look for lifting or opening at all seams and joints.

Insufficient curb flashing height at rooftop heating or cooling units. The membrane flashing may not be carried high enough up the curb. In the steel perimeter frame, at the bottom of the rooftop unit, there are rectangular openings. These openings are for the forks of a tow motor to pick up the unit during transit to the building. If you suspect a problem, get down on your hands and knees and look through these openings. You should see the metal counterflashing or, at the very least, the membrane.

Often you only see the wood curb. Wind-driven rain or drifting snow can get in here and leak into the building. Some units come with little holes in the frame on either side of these rectangular openings. These holes are for screwing cover plates over the openings. A common tip-off to this problem is caulking at all the joints and fasteners in the unit casing. You should suspect that there is a leak that nobody can find.

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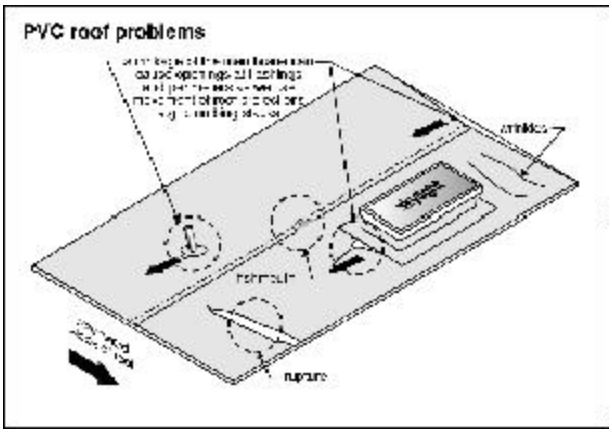
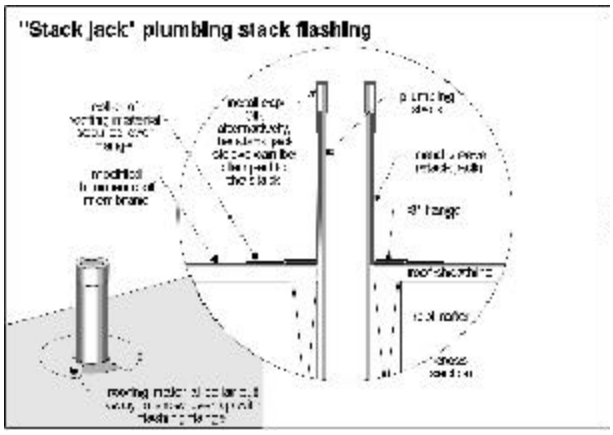




Common Conditions

1. ***View steel columns*** as you would in a house. Look for signs of deflection, deformation, poor connections, poor end bearing, damage from tow motors (forklift trucks), corrosion, etc.

   Damage at the base of steel columns in industrial buildings is common. This is typically the result of impact damage from tow motors. The midpoint of the column is the most critical area, as this is where maximum bending stresses will occur. Therefore, repairs to the base of the column may not be a priority, unless severe damage has occurred.

2. ***Hollow steel structural sections*** used outside, may be subjected to condensation or water leakage to the interior. This may cause corrosion from inside the structural steel member. Unfortunately, it is difficult to ascertain from a visual inspection whether this is occurring.

3. ***Corroded steel lintels*** are commonly found in older masonry buildings. These buildings typically did not have a rain screen cavity space or weep holes to allow moisture to escape.

   The lintels can be visually assessed for surface corrosion. In more extreme cases, horizontal or stepped cracking away from the bearing point of the lintels on the masonry units can be detected. The cause for this cracking is the considerable expansion forces generated by the corroding steel. This type of cracking is most noticeable at the top of the building, where there is less mass of masonry to “lift up,” and greater exposure to moisture.

   Replacement of these steel lintels may ultimately be necessary. This may be deemed necessary when considerable deformation or sagging of the steel lintel occurs or when “pyramid” cracking in the masonry occurs above the lintel. Replacement of the lintel would involve removal of the masonry above it.

4. **Fire damage** to steel members can be identified by discoloration of the steel, and by unusual deformation of the steel.

   When steel is exposed to a fire, it does not burn. However, the heat from the fire can elevate the temperature of the steel to a point where it loses most of its strength. When this occurs, the steel can fail in the direction of loading. If loading is predominantly down, then it will sag. If the steel is in shear, caused by deformation of a roof deck, the steel may be bent out of shape, in a plane parallel to the roof deck.

   If any deformation of the steel is noted, no matter the cause, a structural specialist should be engaged.

5. ***Open web steel joists (OWSJ)*** combined with steel decking are common components for roof structures. This steel combination covered with concrete is a system often employed as floor structures. The joists depth, span, style and spacing is all designed and cannot be evaluated during a visual inspection.

   However, connection points on walls and beams should be checked. The OWSJ should have lateral bracing, typically in the form of lengths of small-dimension steel angle, connecting the chords or webs.

   The bottom chords are typically connected to the tops of every line of steel columns and every 12 to 16 feet along a bearing masonry wall. This provides lateral support and helps to transmit the diaphragm action of the roof to the exterior walls.

   Where bolts are missing at connections, there should be evidence of welding to secure the connection. If not, further evaluation is required.

   Joists may also have the bottom chords attached to a supporting masonry wall. This is done for the benefit of the wall, as the OWSJ may be providing lateral support to the wall.

Transformers

Types

Transformers can be indoor or outdoor. Indoor transformers are typically step-down and are used in buildings with 600-volt incoming services. These transformers are usually **dry-type**, which means they rely on natural air circulation for cooling. Dry-type transformers are by far the more common and can be identified by the many ventilation openings in the casings.

Wet-type transformers rely on a liquid coolant for cooling purposes. These are typically larger units found on the exterior or very old units found on the interior. Some of the larger exterior units have metal sections (similar to a heat exchanger from a furnace) and may have fans to create airflow across the heat exchanger.

Interior transformers in a locked room that cannot be opened by the owner are typically owned by the electric utility and are beyond the scope of the inspection.

Exterior transformers are typically **pad-mount** (installed on a concrete slab) and can be customer- or utility-owned. A telephone call to the local electric utility would determine who owns the unit.

Substation

If the exterior transformer is large and surrounded by fencing, it is typically referred to as a **substation**. Substations are found in buildings with significant power requirements. The inspection of a substation should be left to a specialist. Testing, such as oil analysis, can be undertaken to determine the condition of the equipment. The transformer in a substation can be customer- or utility-owned.

Determining the line voltage

One way to determine the line voltage is to look for a transformer. If there is a transformer, the source voltage is generally 600 volts. The transformer is there to step the voltage down for use in the office areas etc. If the line coming in goes straight to the panel splitters and breaker panels, then it's 208 volts, as you would not have 600 volts going to outlets, etc.

As always, there are exceptions. In rare situations, there is a transformer to step the voltage **up** from 208 volts to 600 volts. This would be used where 208 volts is fed to a building and 600 volts is needed for a specific piece of equipment.

Step-up versus Step-down

How do you tell the difference between a step-up and a step-down transformer? They are the same piece of equipment except a step-down transformer will have small, high-voltage cable on the input side (closest to the source) and large, lower voltage cable coming out. A step-up transformer will have large, low-voltage cables closest to the source and small, high-voltage cables exiting the transformer. Or simply stated, if the cables are smaller at the source side, it's a step-down transformer. If the cables are large at the source side, it's a step-up transformer.

Some transformers are used for specific pieces of equipment and may step up or down to 480 volts, for example. The data plate on the transformer tells you the primary and secondary voltages.

A transformer should not have any conduit coming out of the top of the cabinet, unless rated for such use. Conduits penetrating the top of a transformer tend to collect heat generated by the transformer and can overheat the wires.

Grounding

The transformer should have its own ground cable. The ground cable should be continuous from the transformer to the termination point (usually next the ground for the main service, on the water pipe).

Central chiller

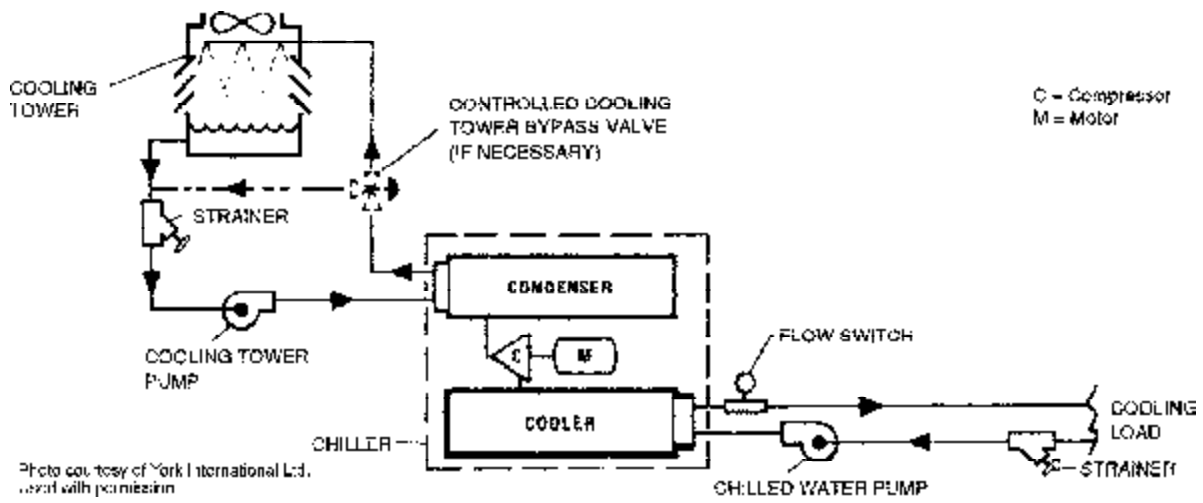
A water chiller system consists of an electric motor, compressor, condenser and cooler (evaporator). A refrigerant is used in the system, similar to residential systems. It's the change in state of the refrigerant that absorbs and rejects heat.

A central chiller system uses the compressor and refrigerant to cool a liquid (water). A heat exchanger (cooler) is used as the evaporator. The chilled liquid is circulated to —

- coils inside a mechanical air handler to cool the air flowing through the ducts, or
- local heat pumps where heat is transferred to the cooling medium.

The heat gathered by the liquid is brought back to the cooler and given off to the refrigerant.

The other part of the water chiller is the condenser, where the refrigerant transfers heat to a second liquid loop (water or glycol). This second liquid loop is pumped outside to a cooling tower, where the heat is ultimately dissipated to the exterior air.



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Typical chiller arrangement

Centrifugal and reciprocating chillers

Centrifugal chillers are the most common for larger systems (over 200 tons). They operate with a rotating impeller or vane to pump and compress the refrigerant. Centrifugal chillers have a life expectancy of approximately 30 years and a replacement cost of $ 400 to $ 600 per ton. Centrifugal systems are more expensive, compared to reciprocating chillers, but are more efficient. Most newer units consume about 0.5 to 0.7 kW per ton of cooling produced.

Reciprocating chillers are more common on smaller installations (under 200 tons). They operate on a reciprocating piston principal, similar to an air compressor. They have a life expectancy of approximately 25 years and a replacement cost of $ 500 to $ 700 per ton. Efficiencies are in the 0.8 to 1.0 kW/ton range.

Refrigerant retrofit

Because of the phaseout of CFC refrigerants, you should be aware of options such as changing an existing chiller over to a different refrigerant versus chiller replacement. However, the details of this decision making process are beyond the scope of a typical inspection.

Photo 9. Polyurethane membrane on suspended slab of parking garage is wearing off.

Photo 10. Slab edge repairs being undertaken to balconies. Note the new steel rebar is epoxy coated.

Photo 11. Typical corrosion of steel anchor embedded in concrete balcony slab, causing concrete to spall.

Photo 12. Numerous epoxy injection repairs to cracking in underside of suspended slab of parking garage.

Photo 13. Significant settlement of slab on grade in an industrial building.

Photo 14. Typical settlement cracking in solid masonry wall of an older downtown building.