Presentation Synopsis

Plumbing Systems

Building Condition Assessment

Vancouver, B.C.

Prepared for:

EPIC

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1 INTRODUCTION

This report has been prepared as a supplement to a presentation on Plumbing systems in terms of building condition assessment.

2 STEPS TO CONDUCTING YOUR PLUMBING ASSESSMENT

The overall steps in your plumbing assessment will be similar to those outlined in the HVAC systems paper. An abbreviated discussion is therefore presented below.

2.1 Assemble Documentation

Plumbing drawings are less critical in the assessment process (compared to HVAC systems), although they can be useful to understand where risers are located. In buildings with mostly drywall finishes, it can be a challenge to figure out the routing of domestic water supply pipes. Heading down to the basement level might tell you at least part of the story if drawings cannot be located. Also looked for bulkheads along ceilings and any access doors where hard ceilings are present.

In terms of building age, the most important consideration is the age of the copper piping. Very old cast iron piping (30 yrs +) can be an issue, but usually only with fittings.

2.2 Interview

With plumbing systems, the most important aspect to uncover from people is the condition and history of the domestic water distribution system. Ask if the building has undergone a repipe. If a person says yes, don't stop there. Ask when this was done and by whom. Ask if the entire system was replaced. Clarify if just the hot water was replaced. (What about the recirculation piping?) If there has been some repipe work, ask what type of replacement piping was used, and if the lines were insulated. Also ask if firestopping was used.

2.3 Walk Through

As with your HVAC assessment, start by walking through the occupied spaces. Look for ceiling tile stains, water stains on walls, mould formation, and the condition of visible components such as plumbing fixtures.

Next pop up ceiling tiles and look through access panels. See if the pipes are insulated, and check pipe hangers. Look for plastic piping and note the colour.

Go to the roof. Inspect plumbing vent pipes and roof drains.

Walk around the exterior of the property. See if manholes and catch basins are clean. Also have a look for clean outs from the perimeter drainage system. (If there are no clean outs, the building might not have a footing drainage system, or if there is one, it may have never been flushed.)

Once again, end your tour in the main mechanical room. Cover the following:

1. Piping: Look for leaks, presence/condition of insulation, support. Ensure areas subject to freezing have pipes heat traced and insulated.

2. Boilers: Check for backflow devices on domestic water lines, and also pressure reducing valves.

3. Pumps: noise, leaks

4. Sumps: Functioning alarm panels with visual/audible alarms

5. Hot water heaters: Is there a vacuum breaker? If a check valve has been used on the cold water inlet, is there an expansion tank on the hot water side? Are P&T valves piped to the floor?

6. Seismic: are tanks secured?

2.4 Summarize & Prioritize

Summarize your findings and recommendations. Consider both operating and capital measures.

Decide if testing would be merited. Consider:

1. Pipe sample cuts and analysis

2. Asbestos testing

3 PLUMBING SYSTEMS

3.1 Types

As part of your assessment, you will have to figure out the type(s) of plumbing systems a building has. Some types of plumbing systems to become familiar with include:

1. Domestic water, including pressure boosting
2. Sanitary and venting
3. Storm water, including perimeter/footing drains
4. Gas and oil systems

Some important components to become familiar with include:

1. Piping
2. Service water heaters
3. Pressure reducing stations
4. Pressure boosting systems
5. Backflow preventors
6. Fire stopping

4 PIPE LONGEVITY

4.1 Assessment

The big issue to settle with plumbing systems is whether some or all of the piping will need to be replaced in the near future. There are several aspects to help you come to a conclusion about piping condition. First, you should get as much history about the plumbing system as you can. As mentioned previously, interview the owners, building managers and even tenants/occupants. Find out, as best as you can, the quantity and type of leaks that have occurred.

Look at both straight lengths of pipe and also elbow/tees. Look at pipe penetrations, especially through floors, to see if there is proper isolation from concrete and room for

expansion. If the building has been settling, this can add stress to the piping system resulting in premature failure.

The reason for pipe failure, especially in copper systems, is often not clear. There are a number of factors affecting pipe longevity including the quality of pipe material, pipe wall thickness, water velocity, water quality, water temperature, poor installation practices, and so on. Due to the number of variables, in the end, the time when the piping system should be replaced is an educated guess. Seek expert advise when you need a more definitive answer, but recognize that even the experts do not have a precise methodology or formula to arrive at their conclusions.

How long copper piping systems generally last is a tough question as well. Some domestic water systems in the Lower Mainland have only lasted 15 years, yet there are other buildings with 40 year old piping. Any piping past the 25 year old mark is suspect, but may not be too big an issue depending on the function of the building and how difficult it would be to replace/run new piping.

4.2 Upgrade Options

First, consider the "do nothing" option. This might be merited in the short term where there have been few leaks and money is tight. Some owners do not bother looking into repipe/upgrade projects until the annual cost leak repairs exceeds a certain percentage of the estimated total replacement cost.

Until you replace or refurbish your copper piping systems, look into adjusting the domestic hot water temperature and flow controls. Make sure your recirculation system is not being pumped any faster that necessary, and keep its operation to a minimum. At the same time, be careful not to reduce the hot water temperature too much below 130°F as legionella can start to develop in the pipe and faucets.

Besides doing nothing, there are two main options – replacement or relining. Both have their advantages and disadvantages. For example, relining projects are much less disruptive. New piping can be resized to meet present building code requirements thereby reducing pipe velocities and noise. Take your time looking into these options and don't just rely on a few stories.

5 PLASTIC PIPING

Plastic piping tends to have a number of advantages, especially in terms of first cost. However, you need to keep in mind their limitations. For example, plastic pipe cannot be installed in buildings that are supposed to have non combustible construction. (ABS piping in an underground parkade is a no-no.)

Keep an eye out for polybutylene ("PB" or Poly B") piping – the grey piping. You will even have trouble getting replacement fittings for this material. Check out class action web sites.

6 PROTECTING FROM WATER DAMAGE

Water damage and mould development are major concerns on the West Coast. Your plumbing systems can contribute to these problems if not properly looked after. Key aspects to investigate in this regard are:

1. Perimeter drains: do they need cleaning (or do they even exist)?

2. Roof drains: are there enough and do they need cleaning?

3. Gutters and downspouts: Are they properly sloped; are downspouts properly connected; are leaf strainers causing undue blockage?

4. Freeze protection: are any pipes going to freeze during cold weather?

5. Sanitary systems: are there grease interceptors that need cleaning; is outside piping subject to root problems?

7 OVERALL ASSESSMENT

Do-it-yourself items:

1. Equipment exterior (casings)
2. Leaks
3. Noises
4. Maintenance records

Ask the experts:

1. Internal condition of pipes
2. Balancing of water systems

8 RESOURCES

1. ASPE: http://www.aspe.org/
2. Poly B: http://www.poynerbaxter.com/Polybutylene.htm
3. BOMA: http://www.boma.org/
4. Legionella: http://www.legionella.org/

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