

March 6, 2014

RE: Spires on *****

We reviewed the spires on units 4084, 408, 411, and 318 on Wednesday, February 26th. We were able to get inside all of the spires and have a good look around. Included is a disk of the photographs.

The spires are framed in post-and-beam methods and are clad with a single layer of galvanized steel, which is painted on the exterior and is plain on the interior. Various glazing conditions are found in each spire. They all appear structurally sound. Each spire is directly accessed through a hatch or door.

The problem we were examining was water coming into the units around the spires. The leaking is intermittent and varies at each unit, but a general pattern is that it leaks most during times when the outside temperature is rising past the freezing point. Leaks are appearing regardless of precipitation. There are some suspected leaks during rain in some units. Some of these leaks have been addressed, as in 404, while some are only suspected in other units because it is masked by previous damage.

After examining the spires, it is clear that there is a great deal of frozen condensation on the interior surfaces of the galvanized cladding, caused by warm moist air from the occupied spaces below rising into the spire and condensing and freezing on the metal cladding. When exterior temperatures rise above freezing, this condensation will melt and will run down into the condo.

But it is also possible that there are additional leaks in the cladding, both on the surface and at the junction with the roof.

Two conditions are causing the frozen condensation: the constant supply of warm moist air inside the spire, and the fact that the spires have no sufficient ventilation to the outside. So the solution

is to control these two conditions.

To eliminate the supply of warm moist air, each spire interior needs to be sealed off from the spaces that are warm and moist. This is a fairly simple process of using appropriate materials to weatherstrip in the same way you would any other space., including:

- Weatherstripping and insulating the hatches, as you would an exterior door
- Locating and sealing all of the various small openings and cracks inside the spire that lead to heated spaces, including attics.
- Insulation is not as important as blocking air movement into the spire from warm spaces

In unit 318, a floor and hatch will need to be built separating the attic storage from the spire if the storage area is to be kept heated.

The other condition to control is ventilation. There are some standard louvered soffit vents installed already, but they do not provide enough free area to properly ventilate that much space.

NOTE: sealing the spire from the warm spaces alone will not solve the condensation problem, as the seals will not be perfect. Ventilation must also be added to clear out moist air that will migrate into the space.

For the sealing and weatherstripping portion of the repair, you should look to a local contractor who can use conventional materials and methods.

For the ventilation portion, I will not be able to provide firm pricing unless a specific plan is developed ahead of time, which will add cost. So I am proposing to ventilate the spires by time and materials, with some rough budget numbers provided.

The exact design of each vent will probably vary with each spire, as each spire is slightly different. We will need to access both the interior and exterior of each spire, so we will need to rent a lift. We would also provide final painting. Each vent will be custom-made on site; we may be able to use some standard components.

As a budget estimate for the ventilation, you should plan on \$20,000 for the four spires.



In addition to the warm moist air that comes into the spire through the hatch, there are other spots, such as this transition to the adjacent attic. All of these cracks and gaps need to be identified and closed off.



This is an example of basic repairs made to the sheet metal, probably during the roofing phase, to seal rusted areas.



This is a typical condition of frozen condensation on the back of the sheet metal.



All of the glazing conditions should be reviewed and repaired. 318 had no sealing between the glazing and the structure.