The Bayview Marquis Hotel and Marina Ball Room AHU

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Setting the Scene

Having observed the central chilled water plant under load (Figure 1) …

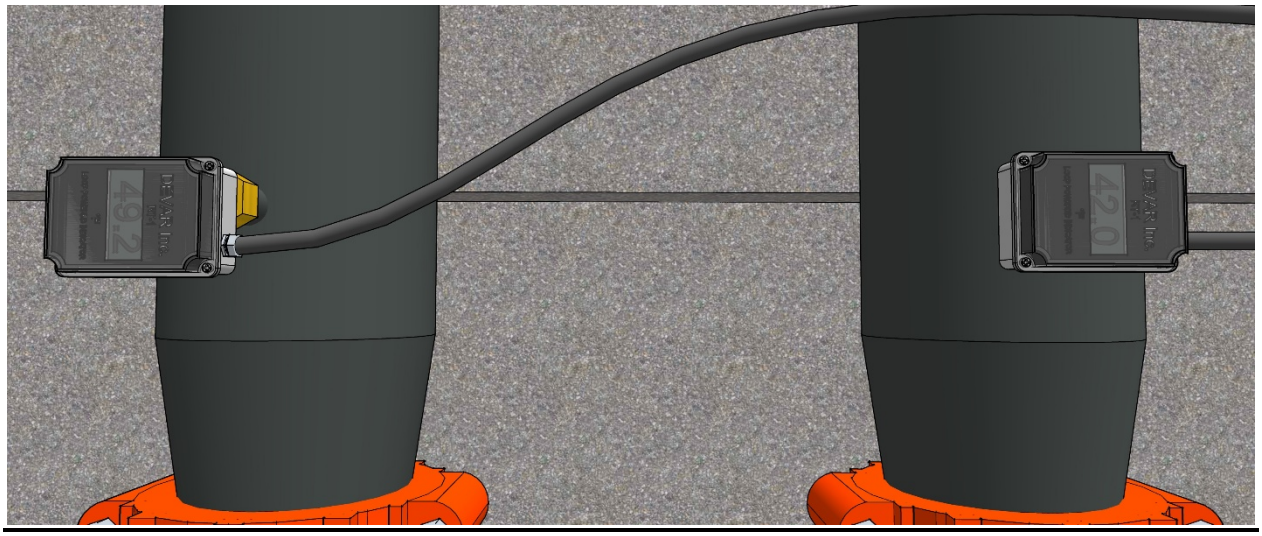

Figure 1 – Chiller Temperature Drop

… on a cool, foggy morning (Figure 2) …

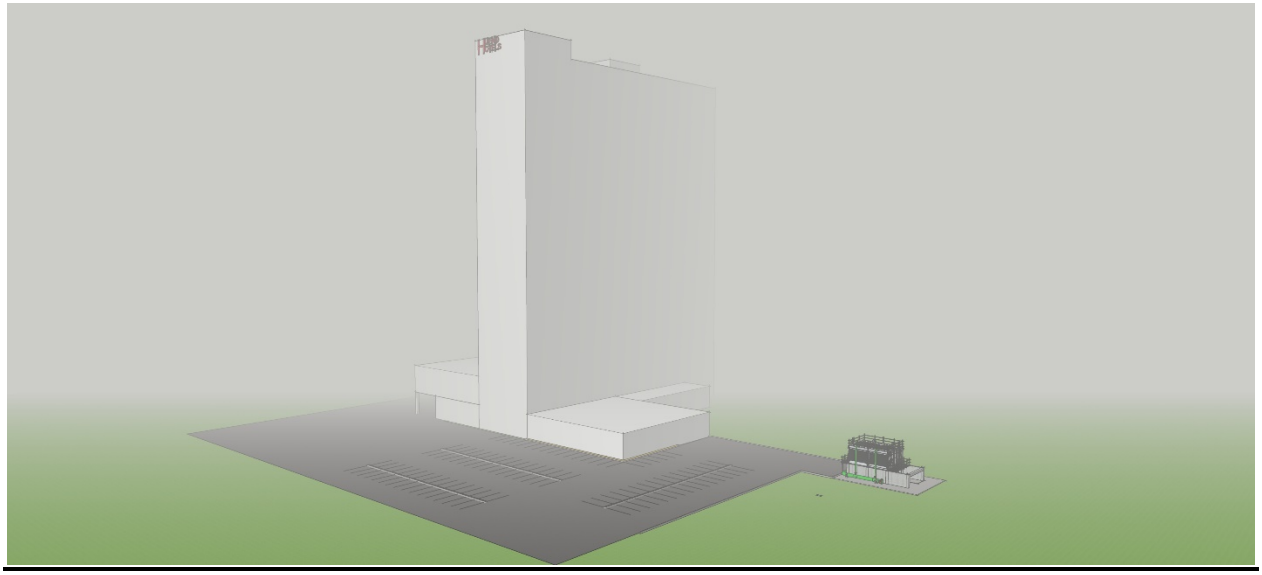

Figure 2 - The Hijend Bayview Marquis emerging from the fog as you approach

You decide to head out to a mechanical room with the chief, her HVAC technician, the GM, and the utility program representative to see what one of the loads on the system is doing. The chief suggests checking out the Ball Room AHU since they recently had a balancer come in and verify its total flow and the 25% minimum outdoor air setting.

The mechanical room where the unit is also located on the first floor, but about 250 feet away from the plant at the opposite end of the building. As you head down towards it the chief mentions that she knows the unit is doing a pretty good job in terms of delivering the targeted Ballroom condition of 72°F because on the way down to the plant, she and her technician checked it out themselves.

The opening session of the National Conference on Building Commissioning is taking place in one half of the ballroom today and the last thing she wanted was a room full of 250 or so commissioning engineers having something to complain about. The other half of the room is not in use, which is typical of about 30-40% of the 5,000 or so hours a year the system operates.

Exercise 1 – Scoping the Central Plant

Overview

Thus begins your first visit to one of the AHUs you are charged with operating and maintaining in your imaginary job as the new DOE for the Hijend Bayview Marquis Hotel and Marina.

This exercise revolves around the ball room AHU and the area it serves. There are at least 21 potential opportunities for improvement that I am aware of. As was the case with the chilled water plant, some of them can be identified by obvious indicators while others will require some knowledge of the fundamental principles behind the equipment and systems and connecting a few dots.

The goal of the exercise is for you to work with your team to see if you can find all of the opportunities, or maybe even others that I wasn't thinking of when I built the model but happen to exist by virtue of what is there and how it is set up. As was the case for the chilled water plant, at least one of the known opportunities evolved that way.

As was the case for the chilled water plant, missing insulation *is not* an opportunity at this point in time. The reason being I am still working on that aspect of the model, so while some of the insulation is in place, I don't have all of it there yet.

The same is true for the control system conduit as I still need to draw the runs to some of the sensors and actuators. But the sensors and actuators themselves may provide some clues that you will find useful in terms of what they show or how they are positioned.

Leading Questions

To facilitate your effort and to provide fodder for discussion when we review your results in our next webinar, I put together the following questions for you to answer. Some will exercise your self-study effort and reinforce important concepts. A few are intended as clues that may lead you to an opportunity.

In addition, you should feel free to use information from the chiller plant model to help you assess things in this model. After all, the plant is serving the ball room AHU and the models are set in the same time frame.

In preparation for the webinar on Monday, March 25, 2019, please work with your team to answer these questions and submit the answers to Barry with a copy to myself no later than close of business on Friday, March 22, 2019.

1. What is the supply air temperature from the system and is it what you would expect it to be based on the information you have available to you?
2. Using a combination of screen shots and narrative, explain and describe how a cubic foot of outdoor air makes its way from outside the building, through the system and back outside of the building again.
3. What type of system is this (constant volume, variable volume, multi-zone, reheat, etc.)?
4. Is AHU the hot water coil a reheat coil, a preheat coil, or a warm-up coil? Explain the reasoning behind your conclusion.
5. Assess the economizer in terms of its current operating state and its ability to perform the intended function. Explain you're your conclusions and what you think the implications of what you observe might be.
6. What is the efficiency of the filters provided in the system?

7. Is there a load on the chilled water coil? Explain how you reached your conclusion.
8. What would you estimate that the relative humidity is in the ball room at the time you are looking at the system? Explain how you reached your conclusion.
9. Are there any design review lessons to be learned from the installed configuration of this system? If so, what are they and why do they matter?
10. What are some of the opportunities to improve performance, or save energy and resources that you observed?

Exercise Resources

Ballroom Model

This is the obvious resource of course. All of the recommendations and suggestions I made regarding using SketchUp with the chiller plant model apply to this model as well.

Scene Guide

Similarly, I have supplied a scene guide for this model. All of the information regarding how to use the scene guide that I gave you with the chiller plant model instructions applies to this model as well.