Using Building Data Analytics to Bridge Gap Between Teams

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Project at a Glance

Location: Michigan Facility: Hospital Facility 7 Minute Read



Highlights

- Building Data Analytics provided a true north between the disgruntled design/construction team and the Owner's Facilities team.
- The Owner finally had peace of mind when the data showed the true story of the facility operation from building issues to equipment corrections.
- The building data analytics identified key areas of focus while confirming operation of the remaining equipment.

THE PROBLEM

A large hospital system in Michigan constructed a new outpatient clinic. A 3rd party Commissioning Agent (CxA) was hired to provide commissioning services including ensuring that a quality and tested building would be turned over to the Owner. The CxA struggled to bring the project to the finish line. Unfortunately, there were so many problems with the new HVAC system in the building that the Facilities team did not want to take on the building because of its many issues. The Contractors wanted to sign off because their job was done and the system was installed per the construction documents. The engineer blamed the substandard performance of the system on poor installation practices. The frustrated Owner wanted to pinpoint the issues and resolve them quickly. A good CxA will be the Owner's eyes and ears on a project, but this was not the case. Instead, the Owner was left to lead the team to a resolution. Owners and facility managers shouldn't have to play referees between engineers and construction teams.

Synergy was hired on as a neutral party to review the project up to its current state and connect to the data to identify issues and create a plan that would provide a true north and eliminate finger pointing.

6250 JUPITER AVE. NE SUITE B BELMONT, MI 49306 P 616.726.5025 W SYNERGY-ENGINEERS.COM Owners and facility managers shouldn't have to play referees between engineers and construction teams.



THE PLAN

One of the many problems in the brand-new outpatient facility was it was unable to maintain zone temperature set points in certain areas. The HVAC equipment could not keep up with the heating demand. Synergy's plan was to (1) Perform a design review, (2) Do a submittal review, (3) Connect to the Data, (4) Evaluate the data, and (5) Provide recommendations. With Synergy as the neutral party, this plan would eliminate the finger-pointing of the engineers saying assets were installed wrong and the construction team saying they installed it correctly and believed the design was wrong.

With Synergy as the neutral party, this plan would eliminate the fingerpointing of the engineers saying the equipment was installed incorrectly and the construction team saying they installed it correctly, but the design was wrong.

DEPLOYMENT ARRANGEMENT

Performing a Design Review was the most logical place for Synergy to begin. This involved going through all the design documents and submittals to verify accuracy. To take it one-step further, Synergy also reviewed the load calculations because the Construction team was concerned that the assets were not adequately designed for the facility. After reviewing the equipment selections, Synergy verified they were within reason, but hovering on the edge of capacity. With no safety measures in place for extra load, this was a questionable decision in equipment selections from the design team. Synergy also noted that a traditional heating hot water system with reheat coils should have been designed for this project instead of electric resistance coils. While electric is cheaper at first cost, the maintenance, life cycle cost, and lack of options for additional capacity, make it less desirable.

The next step in the plan was the Submittal Review. This was to confirm the equipment that was installed matched the design team's selections. This review was also performed by the CxA as part of their process. Synergy's review confirmed that the contractor's equipment selections matched the capacities of the Construction Documents.

After the design and submittal reviews, Synergy connected to the data through the Building Automation System (BAS). Through their own specially designed Pelican Case (a mobile box that pulls the building data out of the BAS to the cloud analytical software through a mobile data connection), Synergy gathered building data for a few weeks. This data did not interfere with IT nor did it overrule any security issues and protocols. Synergy's Facility Intelligence team put the data through rules via SkySpark to locate operational issues within the building. Once the issues were identified, Synergy had the contractors follow up and resolve each issue. A review of the BAS graphics and point data was also completed. Missing points on graphics, failed sensors, and trends not set up were a few of the items discovered.



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OWNER SUCCESS

From hiring Synergy for implementation to report, the owner was able to experience results within 60 days in the clinic building. Through Data Analytics, it was confirmed that some of the electric resistance coils were in fact undersized for the actual conditions. Synergy suggested replacing equipment that was undersized and recommended modifications be made to the equipment that was not operating at full capacity. Once the coils were changed by the contractors, the space temperatures in the identified

6250 JUPITER AVE. NE SUITE B BELMONT, MI 49306 P 616.726.5025 W SYNERGY-ENGINEERS.COM areas were no longer cold but meeting the set point. Additional operating and energy conservation measures were identified by the analytics and presented to the Owner. This was a lessons-learned opportunity by the Owner. Evaluating first cost compared to operating cost, long-term maintenance, and flexibility would be looked at in much more detail going forward.

Synergy wanted to continue validating the business success and left the Pelican Case on the facility data for an additional 12 months. This gave the owner confidence that all the earlier problems were resolved, and any new ones would be caught quickly before the building's warranty phase expired. The Owner had peace of mind with the data showing the before and after differences throughout the building.

Data tells an accurate story and solved the battle between the design team's frustration and the construction team's complaints. Putting finger-pointing aside, Data Analytics cleared up questions and paved the way for the construction team to turn over a functioning building to the facilities team. Data Analytics cleared up questions and paved the way for the construction team to turn over a functioning building to the facilities team.



*For an actual example of a Data Analytics project, please see the appendix.



Appendix



Below: Example of VAV heating at 100% but zone temperature less than setpoint (insufficient capacity).

Below: Summary of operational issues inside the analytical software with duration, cost, and location.

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| Swivel | Tab | | | Dila | | | ⊨ x <u>↓</u> ∎ |
| All Sites Sel | ect | Apr-2018 | | Rules | Opti | ons | |
| All Sites | | P.I. | Duration | | Gent | | Facility |
| Carvtown | > | AHU Fan Failure | Duration | 51.25hr | Cost | | (i) Carvtown RTU-1 |
| ourytonin | 1 | Lights On and Unoccupied | | 68.75hr | \$165 | - 1 C O - C | Carytown Main Lights |
| | | i Temp Sensor Failure | | 672hr | | | (i) Carytown RTU-1 |
| Gaithersburg | > | (i) AHU Cool Failure | 1 | 5.25hr | | | (i) Gaithersburg RTU-1 |
| | | (i) AHU Heat-Cool Mode Cycling | | 32.5hr | | | (i) Gaithersburg RTU-1 |
| | | (i) AHU Fan Short Cycling | | 73hr | | | () x 2 |
| Metal Forming | > | (i) AHU On and Fan Off | 1 | 35min | | | (i) Metal Forming RTU-1 |
| | | (i) Bay Lighting On and Unoccupied | | 7.98hr | \$19 | | (i) Main Lights |
| | | (i) Heat Treat Temp Out of Range | | 8.5hr | | | (i) x2 |
| | | (i) Heat Treat Temp Too High | L | 2.25hr | | | (i) Heat Treating |
| | | i Heat Treat Temp Too Low | | 6.25hr | | | (j) x2 |
| | | i Units Down 10% | | 24hr | | | (i) Metal Forming 1 |
| Short Pump | > | (i) Daily Consumption Limit | L | 3.5hr | | | (i) Flow Meter |