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ARCHITECTS ENGINEERS PLANNERS

Energy Efficient Indoor Air Quality
Preliminary Report
October 2020

Progress to Date:

A. General

1. Bi-weekly team meetings 9/29, 10/13, 10/27
2. Monroe County COVID cases are up from 20 cases per day to 50 cases per day (7-day average)

B. St. John Fisher

1. St. John Fisher has moved to 100% remote learning for the remainder of the semester due to a spike in cases on campus.
2. Analyzing available trended data, schedules, damper positions, and other control points within BMS on building by building basis. Investing operable changes as buildings enter in to heating mode.
3. Working with Facilities staff to update any missing AHU technical data or other
4. Discussions with second UV vendor in progress to compare "on-the-fly" kill rate data.
5. Created three separate calculation workbooks for buildings served by constant volume RTUs, variable air volume RTUs, and MAUs. Calculations include:
    i. Scheduling
    ii. Pre- and Post-Occupancy Flush with UVGI
    iii. Pre- and Post-Occupancy Flush without UVGI
    iv. Filter and Coil Static Pressure Impacts Due to UVGI
    v. OA Code Minimum vs Current OA Provided

C. The Harley School

1. MERV 13 filters have been installed throughout the building.
2. Harley is actively working with their BMS contractor to make software adjustments, test functionality, and upgrade failed or failing control components.
3. Discussions with second UV vendor in progress to compare "on-the-fly" kill rate data.
4. Lower School and Middle School are 100% capacity in-person daily. Upper School is utilizing a hybrid approach of 50% in-person capacity every day.
5. Analyzing available trended data, schedules, damper positions, and other control points within BMS. Investing operable changes as buildings enter in to heating mode.
6. Discussions with second UV vendor in progress to compare "on-the-fly" kill rate data.
7. Created three separate calculation workbooks for areas served by constant volume RTUs, variable air volume RTUs, and MAUs. Calculations include:
    i. Scheduling
    ii. Pre- and Post-Occupancy Flush with UVGI
    iii. Pre- and Post-Occupancy Flush without UVGI
    iv. Filter and Coil Static Pressure Impacts Due to UVGI
    v. OA Code Minimum vs Current OA Provided

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Study Findings to Date

A. Resources and Guidance Documents
   1. ASHRAE Guidance
   2. NYS Department of Health
   3. NYS Education Department
   4. Manufacturer's literature (UV, filters)
   5. CUNY Building Performance Lab
   6. NIH UV Reports and Findings on COVID

B. Building Specific Opportunities
   1. St. John Fisher
      i. Most AHUs/RTU filters have been upgraded to MERV 13. Units with VSDs installed have little to no impact on total airflow.
      ii. According to the BMS, several OA dampers on AHU/RTUs were found to be 100% closed or 100% open.
      iii. All buildings are scheduled to have occupied hours 24/7. St. John Fisher has increased the range of allowable space temperatures to reduce energy usage.
      iv. Currently investigating the use of UVGI systems with AHUs and RTUs.
      v. Pre-and Post-Occupancy Flush for 95% elimination of airborne contaminants per ASHRAE guidance.

   2. The Harley School
      i. Ventilation air ranges between 25% and 100%, depending on the AHU. Continued coordination with site to determine minimum recommended OA % (based on floor area, air changes per hour, and served zone) ongoing.
      ii. Modulating AHU fan speed may require each downstream VAV box to have their logic control modified to maintain minimum outside airflow.
      iii. May need to coordinate activities with The Harley School and their controls vendor for system updates and modifications.

C. Findings
   1. St. John Fisher
      i. Existing coil conditions are likely reducing cooling capacity and airflow performance
      ii. Several RTUs have filters that have been dislodged from the filter bank, significantly reducing the effectiveness of the filters that remain installed.
      iii. Over pressurization issues exist within several other units derating the performance and capacity of the units
      iv. Several OA damper positions were found to be 100% closed during occupied hours.
      v. All HVAC systems on the campus are currently schedule 24/7 with no unoccupied schedule or temperature setbacks.

   2. The Harley School
      i. Range of acceptable space temperatures has been expanded to allow for more flexibility in the volume of outside air delivered to each zone. This will be adjusted in summer/shoulder/heating season as needed.

ii. Some sensors are not reading correct in air handling equipment (relative humidity, static pressure, temperature sensors, CO2 sensors). Deeper evaluation to occur during RCx in November.

D. Lessons Learned
   1. Updates and changes to COVID guidance from reputable sources need to be constantly monitored (NYSED, ASHRAE, NYDOH), as minor updates and release changes can happen without notification. For example, UV is now acceptable for P-12 schools, if they are not active in any occupied space. In AHU usage is also acceptable.
   2. Vendors are regularly reaching out to The Harley School with products and information, some of which conflicts with NYSED guidance. We are offering our knowledge to assist in decision making.
   3. Current 24/7 operation of AHUs may limit the ability for savings. Will need to further evaluate opportunities with St. John Fisher, such as:
      i. Reduced OA at night
      ii. Wider temperature setpoints at night

E. Work Plan Adjustments

   None

F. Schedule Outlook

   Draft report to NYSERDA on December 1

G. Next Steps
   1. Complete calculations and initiate RCx plans.