New and (Sometimes) Improved

FHEA Spring Meeting
May 18, 2018
Introductions

• Bobby Baird:
  o Director of Facility Operations for UF Health
  o 24 years of experience
  o Responsible for environmental services, safety, security, construction, grounds, and property management

• Chuck Gaziano
  o VP of Operations and Principal at Working Buildings
  o 34 years of healthcare experience as engineer of record, D/B contractor, commissioning, and forensic trouble-shooting
Overview

• Several recent technologies being installed at both new and existing healthcare facilities

• Often significant gap between expectations and results due to:
  o Promises/expectations/actual performance
  o Misapplication of the technology
  o Design errors
  o Installation errors
  o Control sequence misalignment
  o Operator training and comprehension

• Spend the next 25 minutes on the most common technologies, and share lessons learned and best practices to avoid issues
Objectives
Fan Arrays
Multiple Fan Operating Points
Fan Arrays

• Best Practices:
  o Select fans for stable operation at multiple operating points
  o Include back draft dampers at fan outlets
  o Control wiring to allow disabling fans based on fan heat and operating conditions
Fan Array Variable Frequency Drives

• Multiple variations of number of VFDs relative to number of fans in the array

• Lessons learned/best practices:
  • Single VFD with bypass causes issues with duct pressure high limit safeties
  • One VFD per fan expensive and too much space if more than 4 fans
  • Up to four fans, one VFD per fan
  • If more than four fans, configure VFDs so that 65-70% of fans available if one VFD fails
Kitchen Hood Demand Control
Kitchen Hood Demand Control

• Operational issues:
  o Sensor cleaning, maintenance, calibration, and life span
  o Limited controllability and loop tuning
  o Impact on building pressure (TJC inspections)

• Best practices:
  o Dedicated make-up air units (MUAs)
  o Arrange fans and MUAs based on hood operating hours
  o Simple time schedule based on cooking times
Venturi Air Valves
Venturi Air Valves

• Common Issues:
  • Communication with BAS (refresh rates, remote monitoring, set point changes, set back, airflow vs damper position)
  • Remote alarm capabilities
  • Minimum air flow requirements

• Lessons learned:
  • Limited need in healthcare applications unless rapid changes in supply or exhaust flows
  • If not required by AHJ, ask design firm why being proposed:
    • Initial cost of installation
    • Added complexity/failure point with separate control network
    • Increased difficulty to trouble-shoot
    • Dependence on nearest rep firm for service and support
Boiler Plant Optimization Programs
Boiler Plant Optimization Programs

• Best practices:
  • Practical when boiler plant has multiple boilers to control (at least 3 active boilers most of the year)
  • Consider cost of having to retrofit existing boilers
  • Consider cost of required sensor maintenance and calibration

• Alternate solution:
  • BAS monitors boiler output percentage from boiler control panel
  • BAS program determines boiler configuration based on keeping active boilers at predetermined min/max output range
Actual Power Loss vs. Generator Test
Actual Power Loss vs. Generator Test

- Multiple system/component failures, including:
  - High limit static pressure switches
  - VFD overcurrent safeties
  - Local controller power loss/re-boot (i.e medical air and vacuum, computer room AC units)
Lesson Learned/Best Practices

• General lessons learned/best practices:
  • UPS power at control panels to avoid control system restarts
  • Configure VFDs to auto restart on power restoration
  • Configure equipment with unit mounted controllers (i.e. med air compressors, CRAC units) for auto restart
  • Test all VFDs and equipment for auto restart by failing power at breaker upstream of device for 5 to 10 seconds

• Lessons learned for AHUs with multiple fans and dampers:
  • Isolation dampers closing on VFD status loss causes manual safety trip; add time delay before dampers close
  • Determine required re-start sequence for fans and dampers; may require time delays and/or VFD acceleration setting adjustments to avoid nuisance trips (i.e. fans spinning backwards
Operating Room Setback Strategies
Operating Room Setback Strategies

• Lessons learned/best practices:
  • Need terminal units for both supply and return air at each OR
  • Direct BAS measurement of OR differential pressure (DP) relative to adjacent space
  • Select DP sensor range of -0.1” to +0.1” w.c.
  • Determine air flow offset between supply and return air to maintain minimum positive space DP of 0.02” (higher than 0.01” minimum required by FGI Guidelines, but more stable and repeatable)
  • Select terminal units capable of controlling air flows to accuracies of +/-5%
  • Consult with Infection Control regarding minimum air change rates during unoccupied mode of operation
  • If all ORs in setback, consider raising cooling coil leaving air temperature set point for additional savings (space temp from 64F to 75F; LAT from 45F to 55F)
Questions?