



TAKE AWAY

Fan Wall Systems
Provide Cost
Effective
Replacement

Approach

- Replace a heavy single fan AHU with a modular system
- Meet or exceed air delivery requirements with smaller, lighter footprint

Features

- Multiple modular fans
- Each fan individually removable
- Multiple VFDs controlled to optimize array

Benefits

- Redundancy within the unit
- Replace a fan or motor without a unit shutdown
- Optimize to operate at peak efficiency under varying loads
- Reduce parts stocking for maintenance
- Reduce downtime for repair
- Reduce energy use and cost

MODERNIZING HVAC WITH FAN WALL TECHNOLOGY

Chelsea Group was retained by a client with over two million square feet of commercial and institutional property in Hawaii to assess, design, oversee construction, and commission the replacement of approximately one hundred air handling systems. For the vast majority of systems, fan wall technology was selected and installation and commissioning is complete on multiple systems.

GOAL

The client looked across the aging mechanical infrastructure of their properties and set a goal of modernizing the air handling systems in a manner that looks twenty years ahead rather than twenty years in the past for appropriate technology. Fan wall technology, with its multiple smaller fans operated with advanced electronic controls, met that vision. The fan wall approach addressed multiple objectives:

- Improve redundancy to enable fan replacement without shutting down occupied spaces
- Address increasing ventilation and cooling loads that are occurring with new uses of existing spaces
- Reduce noise and vibration from air handling systems
- Reduce energy consumption



Figure 1: Multiple fans comprise the fan wall

IMPLEMENTATION

Major trials with fan wall technology started in smaller properties owned and operated by the client, particularly those with specific challenges in “like-with-like” air handling unit (AHU) replacement so common in renovations. Space and weight considerations made replacement of large, original, centrifugal fans highly impractical for these systems. Chelsea Group was part of the team for the first three fan wall systems, playing a role of trouble shooting and commissioning the systems.

The client faced a series of catastrophic failures of older AHUs at its main facility in the same timeframe. These failures ranged from the collapse of the metal floor and drain pan of one unit to a fan literally flying apart in another.



Chelsea Group was retained to assess the critical areas of the facility, totaling nearly three-quarters of a million square feet, to determine the condition and recommend the best strategy for modernizing the mechanical infrastructure. The survey found that nearly one hundred of the air handling systems required replacement, many of them urgently.

A complete modernization of air handling systems began in late 2015. By early 2016, the first new fan wall system was operational, replacing a critical unit that had failed. Systematic replacement of all units will occur by 2021.

RESULTS

Benefits realized thus far in the replacement process using fan wall technology include:

- ***Renewed air flows.*** The systems operate reliably at design airflows, meeting the static pressure requirements of the variable air volume air distribution system, ramping up and down smoothly, turning on and off fans for optimal operating efficiency
- ***Quiet operations.*** The systems operate quietly enough that even at maximum speeds, conversations can be held in the mechanical room without raising your voice
- ***Occupant comfort.*** The new fan wall systems track with temperature and humidity needs and deliver required outdoor air ventilation more precisely and reliably, ending the cold and clammy conditions that were common under prior operating conditions

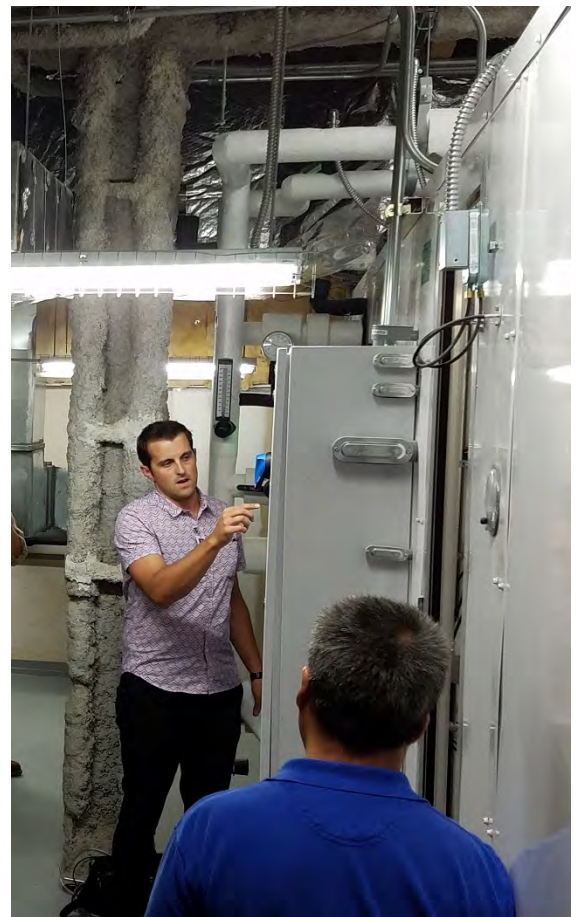


Figure 2: Zack Main provides fan wall training

