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Supplementary HVAC Systems: A Cool Solution

As existing programs are expanded and new services added, facilities must upgrade their heating, ventilating and air conditioning systems (HVAC) to keep pace.

The location and configuration of such alterations to a large degree, dictates the type and configuration of the HVAC solution. One of the first decisions that needs to be made involves the existing HVAC systems that are in place. The efficiency of the existing equipment should be evaluated to determine if it is in need of replacement or can be upgraded and optimized. A balancing report should be commissioned to verify the quantity or air being delivered to the spaces being altered/expanded. This balancing report will reveal how much additional conditioning is needed to serve the new or expanded programs and spaces.

It is usually not feasible to modify an existing system by adding a larger air handler because existing ductwork has been sized and configured for a specific total volume of air (the capacity of the existing unit). Trying to pump higher volumes of air through an existing duct system is inefficient since higher air pressures will most likely increase air loss through leakage. The higher air velocities will also increase "duct noise".

The best approach is to optimize the existing HVAC system and add supplementary system(s) to serve the new programs areas. Once this decision is made, the facility's electric power network must be surveyed to see whether surplus power is available to meet the demand of the new equipment. In hospitals and residential health facilities the emergency power system should also be evaluated as some of the new equipment may require emergency power.

HVAC systems can be configured in several ways. The most common are packaged rooftop units where the fan, compressor/condenser (cooling element) and heating element (usually a gas fired furnace) are all combined in one package. Among the advantages to rooftop units are that they don't take up room inside the building, they have easy access to fresh air and don't need chimneys and louvers to vent heat and combustion to the outdoors (since they are already outside). Packaged units work best when the space being altered is several stories below the roof and there is ready access to fresh air (through exterior walls).

Split systems have their fans in one location (indoors) and their condensers in another (outdoors). Heating is usually accomplished by an electric or hot water coil to avoid the need for a chimney as with gas fired heaters. Where space is tight and headroom is low, the best approach is to "divide and conquer", installing several small "splits" versus one larger unit. Using the multi-unit approach keeps ducts shallower and keeps fan enclosures smaller, making it more feasible to suspend fans above ceilings. Smaller units (below 2,000 CFM) also have the added benefit of not needing an expensive economizer and need not be interlocked with the facility's fire alarm system.

A Third option is to install an Energy Recovery Ventilator system or ERV. ERV is the process of exchanging the energy contained in normally exhausted air and using it to treat incoming ventilation air. Benefits include higher efficiency, smaller ductwork and lower power demand. Today's tougher energy codes are making ERVs almost mandatory for new construction and gut alterations.

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