Skillful Planning Licks Problems Of Air-Conditioning Installation

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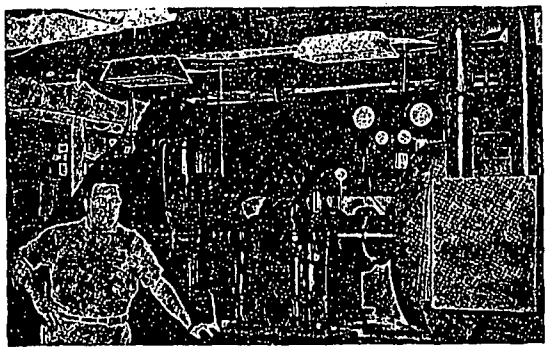


1 Refrigerating compressor located in the basement chills the circulating water, which is pumped for distribution to the attic space above the thirteenth floor

Fitting equipment into this occupied structure meant more than just connecting the various parts. The job had to be done with a minimum of noise, and the engineers had to come up with the answer to, "Where do we put the cooling tower?"

▶A YEAR-ROUND air-conditioning system, which services 400 guest rooms of the Ansley Hotel, Atlanta, Ga., presented unusual installation problems associated with structural work on an occupied building.

The job was complicated because the main structure was built in 1913 and an annex added in 1923. Also, work had to be planned for minimum interference with business, as a hotel cannot completely close its doors.

Cooling Tower. Location of the cooling tower was a problem. Physical changes to the building after erection prevented placing the heavy tower on the roof. Answer was to erect a structural-steel framework on rock foundation at subbasement level and build it high enough to clear the elevator penthouse. This amounted to a one-room 15-story "skyscraper."

Refrigerating equipment was bulky and as the machine room was two floors below street level, special provision had to be made for lowering the machinery into place. Space was not available to bring it into the building at street level and lower it down the stairs, so the only alternative was to dig a pit through the sidewalk to subbasement level. The pit was 20 ft long, 25 ft deep and 5 ft wide. Additional width would have made the rigging job much easier, but a district steam main, and nearby telephone cables interfered. The extreme length was required because we could remove the subbasement wall only between two columns, which were on 12-ft centers. The chilling and condensing units were canted in the pit to pass between the columns.

Water Circuit. General scheme for distributing the water is to heat or chill it in the subbasement machine room and then pump it to an attic space above the thirteenth floor. From there it is distributed to downfeed risers for individual room units and to the central-station air system. A return line on the second-floor ceiling collects the water and carries it to the basement in a closed circulating system.

The central station for supplying air is on the thirteenth floor with its distributing conduit in the attic space above. Air goes to the individual room units through conduit located in the same space with the water supply and return lines.

This vertical distribution system, while easy to install in a new building, presents certain problems in the remodeling of an occupied structure, especially a hotel. For instance, in an office building work can be done at night with occupancy continuing throughout normal working hours. A hotel, however, is normally occupied 24 hours a day, which necessitates removing a room from service and completing all work before it is considered ready for occupancy.

Room Grouping. In the Ansley Hotel each vertical set of risers serves a minimum of ten rooms. Careful investigation showed that, to keep the required demolition, installation and reduction moving at the most economical speed, it would be necessary to have a minimum of five "stacks," or 50 rooms, out of service at the same time. When a set of risers serves more than one stack, additional rooms were, of course, required.

Cutting Floor Holes. As the hotel is of reinforced-concrete construction, cutting floor holes for conduit risers is a noisy job at best. We first tried an oxy-acetylene flame, hoping that the concrete might be calcined sufficiently to allow cutting a hole of the desired circumference. This did not prove successful. Next, we used carbide-tipped drills. Holes, ¾ in. in diameter, were drilled around the circumference and the center knocked out. This method was only partly successful and the high amount of drill breakage made it uneconomical. Accordingly, it was abandoned. After two attempts the majority of pipe runs were cut with ordinary drills and hammers.

Component parts of the system are:

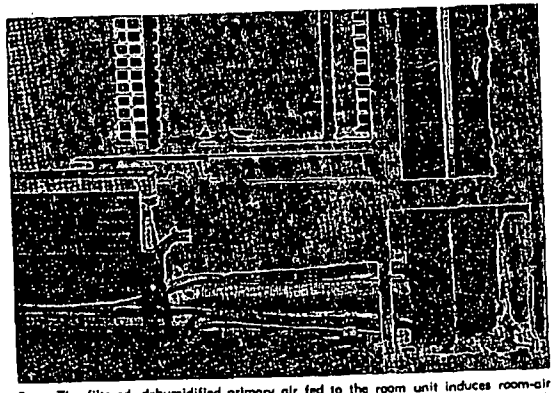
1. High-induction type unit designed for installation in each air-conditioned room and for under-window air distribution.
2. Conduit air-distribution system and air-handling accessories consisting of central-station conditioning equipment and necessary conduit.
3. Circulating water pipes, zone valves and controls.

Room Units. Under-the-window units consist of a mixing stack where primary air (outside air) from a central filtering and dehumidifying source is mixed with induced (secondary air) drawn from the room over a plateñn coil in the unit. Temperature of the water supplied to individual units is controlled at a remote source in accordance with zone requirements. A special device, which the room occupant can adjust, controls water flow to individual units.

The system includes a specially designed sound-absorbing plenum chamber which reduces air noise generated in the risers to an acceptable level. Other essential parts are a regular drip-pan-and-gutter assembly to collect condensate, which might occur under abnormal conditions, and an emergency drip pan to collect condensation forming on the return bends, control assembly for small leaks in connections.

Induced Circulation. An adjusting valve assures obtaining proper nozzle pressure to induce the desired air circulation. It can be used for shutoff purposes if the unit is not in operation. Another feature is the nozzles that regulate air-flow induction ratio of about four to one. This means that, for each cubic foot of air discharged by the nozzle, four cubic feet are drawn from the room into the unit by induction. Thus it is possible to do practically all cooling and heating with only one air stream while primary air from the central station fulfills the ventilating requirements and maintains proper humidity conditions. This separation of the functions of temperature and humidity controls makes it possible to

2 Central station for conditioning the makeup air is installed on the thirteenth floor so that the attic space above can be used for the distribution headers



3 The filtered, dehumidified primary air fed to the room unit induces room-air circulation over a cooling or heating coil in the circulating-water circuit