Alachua County Civil Courthouse
AEI Project Number: 10869-00

Background

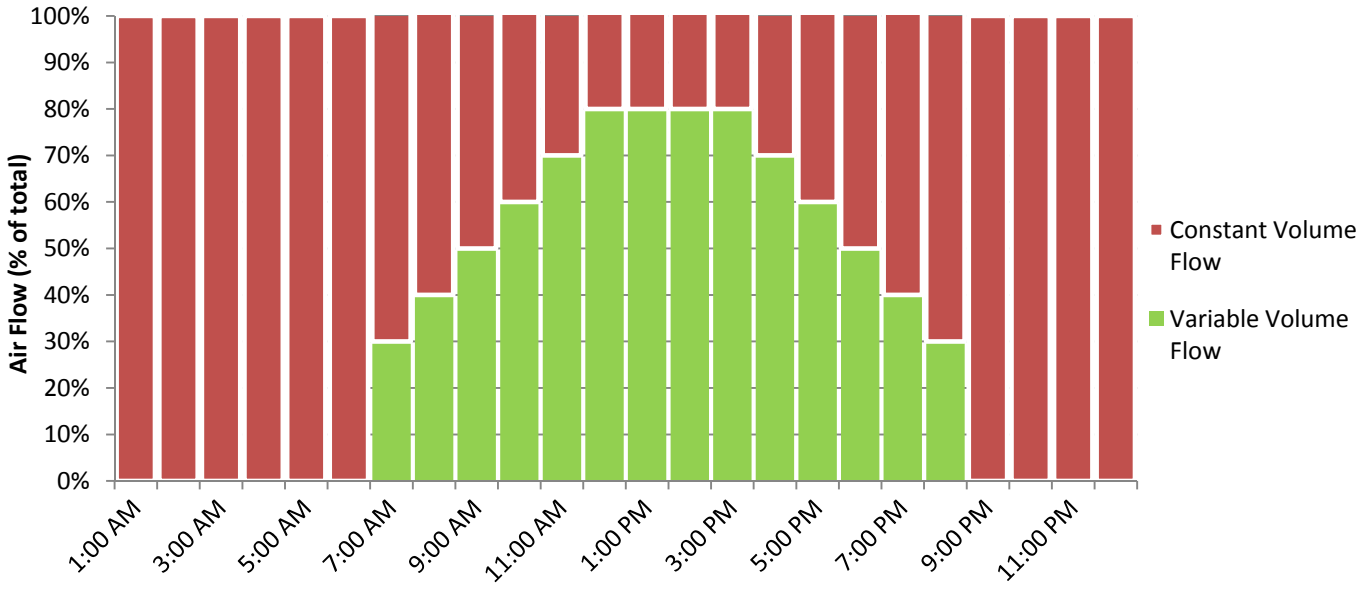
The replacement of the air handling units that feed administrative areas on the basement and first floors, as well as the courtrooms, is being considered for inclusion in the scope of mechanical renovation of the existing civil courthouse. The air handling units, numbered 3 through 13 in the Design Development documents, are original to the facility and are at or past the end of their useful service lives. The American Society and Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) lists the estimated median service life of water-cooled packaged air conditioners, such as these, as 15 to 24 years. As equipment ages, maintenance activities become more frequent and more expensive, and equipment becomes less reliable and less efficient. Therefore the replacement of obsolete air handling units should be considered as an important part of a mechanical renovation to improve occupant comfort. The installation of new air handling units will also result in improvements in energy efficiency. This summary presents an analysis to estimate the energy cost savings and improved reliability associated with the replacement of air handling units 3 through 13.

Analysis

This analysis estimates energy savings that result from more efficient fan motors, improved heat transfer with new cooling coils, and the implementation of variable-air-volume (VAV) air handling units. The table below shows the estimated annual savings corresponding to the replacement of each air handling unit.

AHU Tag	3	4	5	6	7	8	9	10	11	12	13
Motor Savings ($)	2	3	18	16	13	18	18	16	16	18	21
Coil/Casing Savings ($)	78	114	203	183	171	194	194	183	183	194	228
VAV Savings ($)	702	1101	1810	1617	1408	1728	1728	1617	1617	1728	3429
Approx. Total	$800	$1,200	$2,000	$1,800	$1,600	$1,900	$1,900	$1,800	$1,800	$1,900	$3,700

The amount of potential energy savings for each unit depends on the size of the system, the efficiency of new components, and the schedules of operation. This analysis is based on four conservative assumptions: (1) existing motor efficiencies are assumed to be 85% and 88.5% for small and large motors, respectively (2) heat transfer capacity of the existing coils has degraded by 15% from new (3) casings on the existing units leak 5% more than when new (4) the load profile for new VAV systems is as shown in the graph below.



In addition to energy savings, this analysis also qualitatively considers the risk associated with the potential failure of any one of air handling units 3 through 13. As air handling units age, cooling coil tube and header walls erode, bearings and sheaves wear, and motor bearings and insulation wear, which increase the risk of failure and the interruption of court operations. Regardless of the installation of new controls, ductwork, and terminal devices, unless the air handling units are replaced they will remain as the most likely point of failure within any of the specific systems. The replacement of these air handling units would minimize the possibility of a loss of air conditioning in any of the courtrooms or administrative areas.