

"Entegrity's thorough approach to functional testing ensured optimal performance of the HVAC system."

-Trent Keller, Project Manager,  
Action Mechanical

### Project Facts

**Facility Type**  
Federal

**Facility Size**  
50,197 sq ft

**Location**  
Pine Bluff, AR

**Entegrity Services**  
LEED Consulting  
Fundamental Commissioning  
Enhanced Commissioning

**LEED Certification**  
Silver

**Architect**  
CH2M HILL

**Contractor**  
Flynco, Inc

### Commissioning Facts

**Annual Energy Savings:**  
204,663 kWh

**Annual Cost Savings:**  
\$8,600

**Time to Implement  
Energy Saving Measure:**  
1/2 day

## Armed Forces Reserve Center

### Overview

Flynco Construction contracted with Entegrity to perform commissioning on a new Army Reserve Center in Pine Bluff, Arkansas to meet the requirements of the United States Corps of Engineers (USACE). The project incorporated a highly energy efficient design with the goal of obtaining a high performance, low maintenance, low operating cost facility achieved through sustainable and energy efficient design features and construction methods.



### Insights

The project consists of two buildings - a training building designed to support drill weekend occupancy of approximately 200 reservists and a detached Organizational Maintenance Shop (OMS). The training facility consists of offices, classrooms, assembly hall, fitness room, kitchen, weapons simulator and other building support areas. The OMS facility consists of vehicle work bays, offices, tool room, storage and building support areas.

Commissioning for this project included coordination and execution of jobsite reviews of equipment installation (pre-functional testing). A total of three site visits for pre-functional testing were performed, which resulted in a list of issues that needed correction or clarification by the construction team.

The building was occupied in 2011. During occupancy, the building's commissioned systems were tested for proper function under various operating conditions based on approved functional test procedures. During the functional testing process, the commissioned systems had several different tests performed to ensure proper operation, including controls performance verification, testing and balance (TAB) verification and functional tests.



## CASE STUDY

### Average Air Handling Unit (AHU) Fan Power

**Before Functional Testing:**  
29.8 kw

**After Functional Testing:**  
6.44 kw

During a post occupancy commissioning site visit, Entegrity conducted a HVAC controls review to verify proper operation of the HVAC system under various operating conditions. While reviewing the AHU sequence of operations, Entegrity discovered the AHU supply fan was running at 100% to maintain the highest duct static pressure setpoint as determined by a critical zone (CZ) reset strategy. Entegrity performed a variable air volume (VAV) review to determine which was causing the CZ reset sequence to remain at the highest duct static pressure setpoint. After review of all the VAVs, it was determined that one had a faulty damper actuator that was causing the damper to remain in the 100% open position. Due to this wide open position, the HVAC controls system correctly reset the duct static pressure to the highest setpoint in an attempt to get the VAV damper to reduce position. However, the faulty damper actuator prevented the damper from moving and the AHU supply fan continued to run at 100% speed.

Entegrity had the damper actuator repaired and then retested the CZ reset sequence for the AHU. The VAV damper operated correctly after the actuator repair and the AHU immediately reduced speed based on a new duct static setpoint calculated by the CZ reset sequence. During the remainder of the commissioning, the AHU fan speed remained in the 60% range and continues to operate at this speed since the completion of commissioning. Entegrity reviewed trend data for the AHU and faulty VAV and determined that the AHU supply fan ran at the high end speed range (95-100%) for approximately 19 months.

In addition to the savings achieved by reviewing and analyzing the AHU and VAV operation, Entegrity recommended an alarm be added to the HVAC controls program to notify facilities staff if a similar problem occurs. An alarm would be generated if any VAV terminal is in the 100% open position for 48 hours, which would allow the facility staff to verify proper operation of the unit before excessive amounts of time and money are spent.



*Entegrity is a sustainability and energy services company specializing in the implementation of energy conservation and renewable energy projects. Entegrity is uniquely qualified to deliver innovative and sustainable solutions to Optimize Building Performance. Our comprehensive service package includes energy savings performance contracting, commissioning, energy modeling, building testing, lighting solutions, renewable energy, water conservation, and sustainability consulting.*