

An Innovative Solution for The NCCER Performance Verification of A MEP Class

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A partnership was formed between a four-year collegiate construction program and National Center for Construction Education & Research (NCCER) to provide students opportunities to engage in hands-on practical performance verification in the areas of building materials, surveying, MEP systems, and soils. This research study is regarding Air Distribution Systems for the MEP class. According to NCCER requirements, the students need to use certain equipment to measure performance on part of the HVAC system. The performance verification includes: 1) The use of a Tachometer to measure the blower motor rpm; 2) The use of a Velometer to measure the velocity of airflow at the output of the air system supply diffusers or registers; 3) Use this Velometer reading, and by calculating the air duct area to find the system CFM; 4) Use a Manometer to measure the Static pressure in the duct system. In the fall of 2017, one student took this performance verification, and without an “educational HVAC system” to conduct these measurements on, the instructor had to use the HVAC system in her office. They stood on a chair and lifted up the ACT tiles to access the duct as well as placing the instruments by the actual diffuser for the measurements. As there will be a significantly larger number of students that need the performance verification this year, a better solution to enable students to take these measurements with ease is in desperate need.

The objectives for this research project is to develop a new educational tool to facilitate the NCCER performance verification for the MEP class. To conduct the performance verification, the basic tools needed are a blower with a fan motor, and a duct with a diffuser to conduct these measurements. Literature review and an extensive internet search for solutions were conducted to inspire the creation of the new educational tool.

A tool was constructed to facilitate the NCCER performance verification. A list of materials is as follows: Accord Ventilation 301 Series 8-in Dia Galvanized Steel Butterfly Damper, Imperial 8-in x 60-in Galvanized Steel Round Duct Pipe, Accord Ventilation White Steel Ceiling Diffuser, and an Imperial 9.5-in x 3.25-in Galvanized Steel Airtight Adhesive Duct Take-Off. After bolting all of the parts together it gave us a device that allowed the use of all 3 types of testing meters. The fan motor builds up air in the duct and the damper releases the pressure. Two holes were drilled in the round duct pipe to show the Manometer test static pressure. The anemometer was used to test the pressure coming out of the diffuser once it was open. The tachometer was used to get the RPM of the fan motor.

This tool will significantly improve the efficiency of the performance verification process and save the instructor and students from unnecessary troubles. It also serves as an example for the students of how to creatively solve a real-life problem based on the knowledge they learned. If any other construction programs are pursuing a similar route, they can develop a solution based on this tool and they don't have to start from scratch.

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