MAEBA
Mid-Atlantic Environmental Balancing Association

Spring 2013 Volume #18 Issue 1

NEBB

Hydronic System Differential Pressure Controllers

By: Timothy McManus Jr.

One of the more difficult and challenging tasks that NEBB Technicians face is how to tailor their strategies when assigned with balancing a very large hot and chilled water hydronic system. This particular system has approximately 900 chilled and hot water valves. Once the preliminary hurdles of starting the pump, flushing, filling and cleaning the strainer are accomplished NEBB Technicians still face the distinct possibility that the controls contractor may not be able to open all the valves and the system may not be fully installed. Additionally, let's propose the project is phased for occupancy, with the inevitability associated with not returning to completed areas of the project. Finally, the preferred sub-main and branch circuit setters we like to see installed were not included in the design. While the accumulation of these scenarios is daunting; the same question that has presented itself time and time again emerges. "How are we going to maintain our balance with repeatability and accuracy throughout the course of the project?" The answer always involves resetting the pump(s), a volume rebalance of circuit setters, and additional testing and checking. All of which equates to a surplus of extraneous efforts exhibited on multiple fronts. Fortunately, for the industry, a solution has arrived.

Recently our firm, Air Balancing Engineers Inc., was faced with a similar situation, fortunately, the system designer specified Tour Andersson Victaulic Loop Differential Pressure Control Valves. This crucial decision worked to the advantage of the Installer, the Controller, the TAB technician, the Construction Manager and ultimately the

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Fume Hood Conversions

The most widely-used saying about a boat is that it is "a hole in the water, into which you throw money". An analogy could be used for chemical fume hoods; they are "a hole in the *wall*, into which you throw money".

While meant to be humorous, the above statement is unfortunately, very true. Most of the facilities that use fume hoods such as labs, R & D facilities and schools normally utilize what is known as "one pass systems" HVAC systems. These systems make up the air that is exhausted through the fume hoods by bringing in 100% outside air which needs to be conditioned. Fume hoods come in many shapes and sizes and can exhaust from a few hundred up to many thousands of cubic feet per minute of air. Depending on what area of the country the facility is located, the cost per exhausted cfm of air each year can range from a few dollars to over ten dollars. While there are many factors that create variations in the equation, in the Philadelphia area the cost can range from is $7.50 to $9.00 per cfm.

For an "industry standard" six foot fume hood, with a horizontal sash the nominal opening is 62" x 29" or 12.5 square feet. At a velocity of 100 feet per minute (fpm), 1250 cfm of air exhausted. At $7.00 per cfm, the cost to run a hood this of size is over $8,700.00 per year.

All of these numbers add up to expense for the owners of the labs, many tons of pollutants added to the atmosphere each year and a depletion of the natural resources used to power the equipment.

In recent years, fume hood manufacturers have come up with new designs that maintain a safe work environment while exhausting much less air. This is great for new installations. However, while estimates vary; it is believed that there are still over one-half million older style chemical fume hoods in use in this country. One thought is to replace older style hoods with the newer models. While a good idea in theory, estimates place the cost of replacing a fume

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2013 MAEBA Recert Seminar

The 2013 MAEBA Recertification Seminar is being held on September 29 –30, 2013 at the Valley Forge Casino Resort, in Valley Forge, PA. The meeting will begin on Sunday evening with a dinner reception. Monday the seminar begins with a brief safety presentation followed by Scott Smith, P.E. of Accuspec, Inc. presenting the AccuValve® and how it takes critical environment airflow control to the next level with the introduction of the AccuValve with ePI®. The seminar will include additional informative topics.

Valley Forge Casino Resort

MAEBA to host NEBB Sound and Vibration Certified Professional Seminar

September 23-26, 2013

MAEBA Auditorium Conshohocken PA

This is a review seminar covering the engineering basics of sound and/ or vibration measurement. This is NOT a training seminar. Individuals who attend the seminar should already posses a basic understanding of sound and vibration Measurement.

NEBB will be sending out registration information soon!

Fume Hoods

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hood with the associated sheet metal, mechanical and electrical work in the $35,000 to $40,000.00 range. With the current economy, the cost is way beyond the means of schools and companies.

This is where the fume hood conversion vs. fume hood replacement argument starts to make better economic sense. The conversion of a fume hood maintains the basic cabinet box, the existing mechanical utilities, such as water, air, vacuum, steam, etc., the sheet metal connections and the basic electrical connections.

The conversion process includes the following:

* A thorough review of the mechanical equipment serving the space.
* Assessment by a qualified design professional to insure the installation meets all applicable codes.
* Removal of the sash, sash weights, cables and bottom airfoil.
* Removal of the hoods interior rear components (in the event Transite is involved, all applicable standards must be adhered to) and light fixtures.
* A complete cleaning of the cabinet’s interior.
* If not a newer plasticized interior box, painting of the inside of the cabinet

Once all of the demolition of the cabinet’s interior is complete, the installation of the new components can take place. This process includes:

* Installation of new brackets and rear articulated baffle panels.
* Installation of a damper operator to control the rear panels.
* Installation of a new T-8 light fixture.
* Installation of the new sash panel and glass panels.
* Installation of two new airflow sensors.
* Installation of the new airflow alarm monitor.
* Installation of the new bistable vortex controller.

After all of the new components are installed, the entire space including the supply air flows, exhaust air flows and the fume hood exhaust must be tested and balanced. While each space is different, with the conversion the new fume hood exhaust air flow is usually less than one half of the original design air flow.

The final step in the process is to perform an ASHRAE 110-1995 test on each of the hoods that have been converted. This test will insure that the converted fume hoods meet all of the criteria to insure the safety of the hood users while saving money and precious natural resources for future generations.

Finally, while each lab situation is unique, the current ballpark estimate for converting a hood is in the $10,000 to $13,000 range. As with most things in life, economies of scale come into play. The more hoods converted, the better the pricing.

Because fume hoods consume so much energy, the return on investment (ROI) for the conversion of six foot and larger hoods is normally two and one-half to three years.

Differential Pressure Controllers

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Owner because unlike traditional end of loop delta pressure control valves the TA Victaulic Valves are installed at the loop take-off from the piping main or riser. The Delta Pressure Control is a combination of three components:

1. The Series 794 Delta Pressure Controller (STAP)
2. A Series 786/787/788/789/78K (STAD) flow measuring device
3. A one (1) millimeter capillary tube, which connects the STAP and the STAD

The pressure in the capillary tube from the downstream side of the STAD (supply side) valve is connected to the upper chamber of the STAP (return side) valve. The pressure from the return pipe will pressurize the lower chamber of the STAP, thus detecting a delta pressure from all loop components. The stem of the STAP valve will then transfer to its pre-set position, and maintain loop delta pressure. This is a basic explanation of the valve operation.

The five phase project was a major health facility located in suburban Philadelphia. It paired Air Balancing Engineers Inc. and TA Victaulic Fluid Control Technology. All of the loop delta pressures were calculated and provided by TA Victaulic. They also provided the pre-set position for the reheat coil circuit setters; this position is based on the index circuit setter, which is the setter that demonstrates the greatest pressure drop in the loop. Initially, all of the circuit setters on a particular loop were adjusted to their pre-set positions. This was followed by opening the automated reheat control valves. Now, the STAP valve must be set to the design loop delta pressure; using a differential pressure meter, connect to the downstream port of the STAD (supply) and the upstream port of the STAP (return) to measure loop delta pressure. With a five (5) mm Allen wrench inserted into the STAP handle, adjust the valve stem until the desired loop delta pressure is measured. When the desired loop pressure is achieved, test the STAD (circuit setter) to assure the correct GPM is being delivered to the coils. The STAD is used to measure only. TA Victaulic provides a close delta pressure that is nearly equivalent to the turns to open chart, which is metric (KPA÷2.99=PSI). It is extremely important to note that prior to setting the upper and lower chambers of the STAP, the system must be filled and bled, or the valves will not operate! Finally, test the preset circuit setters at the coils, and find that they require only a slight adjustment, and approximately 30% of the setters will not need to be adjusted at all!

To insure repeatability, the pump capacity was increased and decreased while monitoring loop delta pressure. In each case we continually observed a reestablishment of the loop delta pressure. The STAP valve stem moved slowly to its position (about 3 minutes), this was done for testing purposes and is an unlikely occurrence in a stable load building.

There are many positive aspects beyond energy costs and the elimination of temperature fluctuations that should be considered by a system designer or building owner.

A. They insure the automatic control valve does not experience excessive pressure drop across the seat of the valve.
B. The valves are located directly off the riser mains to stabilize the pressure, thus further reducing the potential for noise.
C. Each balancing module is pressure independent from the rest of the system.
D. One dynamic control loop will not cause oscillations in other nearby control loops, which is a major aspect in HVAC and process applications.
E. Each loop can be balanced independently and in any order therefor providing flexibility in working towards the completion of the project.

Conclusively, this product and its support services provides everything necessary for the accurate and timely completion of a project, regardless of associated complexities, size or scope.

For Product Information, Sales, and Support please contact the following persons.

George Van Emburgh
Hydronic Balancing Specialist
610-730-8508 gvanemburgh@victaulic.com

Christopher Wolak
Engineer, Fluid Control Technology
610-923-3888 cwolak@victaulic.com

Rodney McWhirteryoung
Hydronic Balancing Sales Manager
309-360-3112 rmcwhirteryoun@victaulic.com

Safety Column

By: John Connolly

Tailgating

Vehicle accidents impact your companies' profitability, time and work commitments, and your most important resource, your employees. Tight work schedules, traffic slowdowns and workday stress can cause your and your employees to rush and speed while travelling from the office to jobsite to meetings and so on. Getting to your destination on a timely basis is important, but nothing can disrupt a schedule (and maybe a life) as much as a vehicle accident.

Vehicles accidents are costly and many times can be prevented. Tailgating is a major cause of road accidents. Tailgating is simply defined as following the vehicle in front of you too closely. It does not mean you're right on the other guys' bumper, just too close for safety. If you tailgate regularly, you're an accident waiting to happen. Tailgating will also exacerbate other unsafe driving, especially distracted driving.

The stopping distance for a car going 60 mph on a dry pavement, is 366 feet (more than a football field) a pickup, 425 feet, and a heavy two-axle truck, 436 feet. Drivers should have a good, comfortable distance behind the car in front to stop. Use the "three second rule" to provide that cushion. Select an object ahead of you and when the vehicle you are following passes the object, count one one thousand, etc. I recommend counting to four-thousands. Try it at your desk, you'll see we count faster than we realize and four-thousands will be much closer to three seconds!

If the weather is bad and the road is wet or icy, you'll need more distance. If people cut in front of you, slide back and resume your distance. It takes a little time, but in a whole trip it only will take a minute or two of travel time. Aren't those extra minutes better than not arriving at all or being towed?

MAEBA Technical Committee

David Wood—Chairman	Angel Rivera - Vice Chairman	Jeffrey Schools
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Patrick Edmonds	Robert Ulis	Frederick Scafidi
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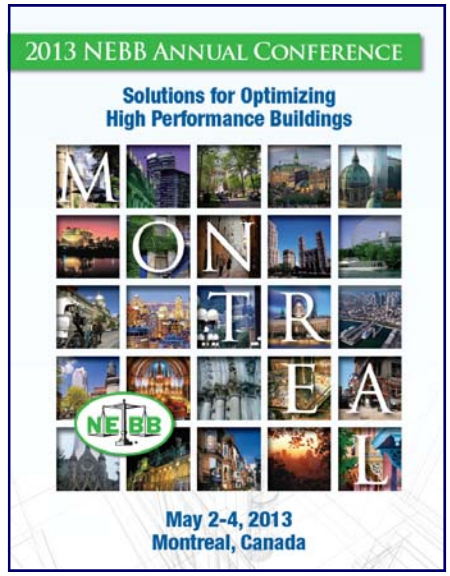
2013 NEBB Annual Conference

The National Environmental Balancing Bureau (NEBB) held its 2013 Annual Conference in Montreal, Canada, May 2-4 at the Hyatt Regency Montreal. Did you miss the Annual Conference! Well NEBB now has all technical session presentations available on their website www.nebb.org.



Technical session presentations:

Air Movement Efficiency
Benefits to Building Owners of S&V in Building Commissioning
Basic of Air Distribution
The Rules for Effective Room Air Distribution
Cleanroom Design & Energy Optimization
Emerging Technologies in Air Balance
System Optimization with Variable Speed Pumps
New Standards – How they Affect Testing Protocols in Laboratory Testing Steps to
Marking Existing Commercial Buildings Become High Performance
Navigating Solutions for Building Projects
Commissioning Team Building: Teaming with NEBB Firms to Perform BSC Work
Healing the Hospital by Eliminating Air Duct Leakage
NEBB's Building Enclosure Testing
Airflow Measurement for Acceptable Indoor Environmental Quality
Deep Energy Retrofits with ESPCs in Government Facilities

NEBB Announces Location of 2014 Conference

2014 NEBB Annual Conference

Delivering Building Performance and Energy Efficiency

April 3-5, 2014
Hyatt Regency Pier 66
Fort Lauderdale, FL

NEBB Educational Seminars and Examinations

NEBB Technical Retro-Commissioning Seminar and Exam
July 17-20, 2013 in Portland, OR

NEBB Fume Hood Seminar for Certified Professionals
September 9-13, 2013 in Kansas City, MO

NEBB Building Enclosure Testing Seminar
September 9-11, 2013 in Washington, DC

NEBB TAB Certified Professional Review Seminar
September 9-11, 2013 in San Diego, CA

NEBB Sound and Vibration Seminar and Exam
September 23-26, 2013 in Conshohocken, PA

MAEBA

Mid-Atlantic Environmental Balancing Association

1100 E. Hector Street Suite 185
Conshohocken, PA 19428

Calendar of Events

September 23—26, 2013
NEBB Sound & Vibration Seminar and Exam
MAEBA Auditorium
Conshohocken, PA

September 29—30, 2013
MAEBA Annual
Recertification and Educational Seminar
Valley Forge Casino Resort

September 21, 2013
NEBB Professionals On-Line Exam
Given in MAEBA Chapter

October 5, 2013
NEBB Professionals Practical Exam
Give in MAEBA Chapter

MID-ATLANTIC ENVIRONMENTAL BALANCING ASSOCIATION

Chapter of the
National Environmental Balancing Bureau

JEFFREY SCHOOLS - PRESIDENT
JOHN MCNEILA - VICE PRESIDENT
DAVE WOOD - T.C.C.
TRISH CASEY - CHAPTER COORDINATOR

1100 E. Hector Street, Suite 185
Conshohocken, PA 19428
(610) 828-5738 Fax (610) 828-4625

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Mechanical & Service Contractors Associations of Eastern Pennsylvania Greater Delaware Valley

SMCA
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