

ASPE NEWS

American Society of Plumbing Engineers

Eastern Michigan Chapter

http://aspe.org/Eastern_Michigan

Serving our membership since 1975

Vol. 13, Issue 8

Plumbing Design Classes

Date: Tuesday, April 20, 2010
Where: Plumbing Industry Training Center
SEE map on back page

ASPE HANDBOOK & VENDOR CLASSES 3:30 - 5:30 PM

Basic: Natural Gas Systems D & E
Vendor: Toilet Flushing Technologies (CEUs)
Speaker: Pat Baker, Kohler Company
See page 3 for program & speaker

DINNER 5:30 - 6:00 PM

Cost: ASPE, ASSE, MBPA Mbrs: NC
Non-members: \$15.00 FOR DINNER

DESIGN CLASS 6:00 - 8:30 PM

Topic: Practical Design & Implementation of Water Reuse Systems

Speakers: Michael Gauthier & David Carrier
See page 3 for program & bios

See the full event schedule on our web site.

REGISTRATION REQUIRED
RSVP by the **Friday** prior to day of class to:

David Rhodes, VP Tech:
drhodes1vptech@aol.com

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PRESIDENT'S REPORT

John R. Nussbaum, IPP, FASSE



LEADERSHIP

Lee Iacocca wrote a book awhile back called *Where Have The Leaders Gone*. I ask, Where are your future leaders going to come from?

Your board members are aging and tiring after many years of serving you, the membership. The Eastern Michigan Chapter has had some fine leaders over many years since its beginning. They encouraged and mentored people like myself and others to fill the board positions as time went on. In recent years, I find

it harder to find people to mentor and encourage serving and running for offices on the board of directors. It seems like every organization and outside activities compete and keep the younger people from wanting to take on these vital positions needed to keep the chapter going.

There are leaders and followers in our everyday lives. Are you a leader or follower? Both are necessary. PE's and CPD's are needed to run for President, VP Technical, VP Legislative, VP Membership and other positions while any one can fill and serve on the board as secretary, treasurer and just be on the board to help run the chapter and participate in the decision making policies of the Eastern Michigan Chapter. Even if those of us are reelected to serve another year, some of us are sure to make it our last year. The question is who is willing to come forward, be appointed and mentored to run for a position in May of 2011?










Currently, we have some talented people in several positions. They are doing a good job of running the chapter. One individual is being mentored by his dad. Your VP Technical is being mentored to possibly run for President in 2011. Year 2011's election will need people to fill some important positions that will be vacated. Please, those of you who have leadership qualities— we need you. Your chapter needs you if we are to remain the dynamic chapter we have been since being chartered by ASPE.

In closing, I wish to thank David Rhodes and Edwin Hawley for filling in for me during the meetings that I was unable to attend because of a very bad cold, and secondly, my wife's fall resulting in an emergency partial hip replacement. Thank you to all who pitched in to make the meetings successful.

Your president,
John Nussbaum

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WANTED

Mechanical Engineer (PE)

Qualified candidate must have 7-10 years of experience in the engineering and design of HVAC, plant utility (heat transfer systems), plumbing and compressed gas systems for pharmaceutical, biotech, laboratory, food processing or other high tech industries. Engineering capabilities to include development of design documents (P&IDs, distribution plans, specifications, etc. for construction). Proven ability to manage projects to implement these systems is a must. Candidate should be a self-starter and possess excellent leadership, communication and computer skills. Candidate should have proven ability to handle multiple complex tasks, ability to market services to clients, and have business and personnel skills.

Qualifications:

7-10 years experience - Bio-Pharma / Lab Experience - PE registration preferred - Bachelor of Science, Mechanical Engineering or Architectural Engineering - Project Management experience - LEED AP preferred - Team oriented individual

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April Tech Program

Practical Design and Implementation of Water Reuse Systems



Michael Gauthier

Michael Gauthier, Division Manager Highland Tank & Manufacturing Company, has over 17 years experience in the water/wastewater industry. Employed with Highland Tank for over 8 years, Michael has been instrumental in the development and engineering of new products for the waste water division. Highlights include development of Highland Tank's HighDRO™ line of water reuse systems. Michael is also co-author of Vol-4 ASPE Plumbing Engineering Design Handbook Chapter 8: Grease Interceptors.

Design Handbook Chapter 8: Grease Interceptors.

Program: The presentation will deal with design tools to engineer efficient water reclamation systems for non potable applications under the framework of LEED. Reclamation from rain, grey water, cooling condensate and wash water will be discussed. Discussion will deal with design, sizing, storage, disinfection and transmission of non potable water. Available LEED points for water reuse systems will round out the discussion.

David Carrier is founder and CEO of QuantumFlow, Inc. For the past 23 years, David Carrier has worked in the packaged pumping systems market. He started as an independent representative in 1984 calling on engineers and contractors. As one of the top sales agents in the country, he was asked to create and develop a packaged systems product line for a major pump manufacturer in 1992. After successfully deploying a national marketing and production organization, he joined a controls manufacturer in 1997 only to return to packaged



David Carrier

systems production in 2001. He is the author of several publications regarding packaged pump systems, specializing in the application and promotion of variable speed pressure control. He spoke on behalf of variable speed design during the 1996 ASPE (EPE 2006) National Convention in Tampa, FL. As one who understands and enjoys the market, David is the "hands-on" director for all engineering, sales and marketing of QuantumFlo, Inc. of DeBary, FL in addition to being its Chief Executive Officer.

Program: In follow-up to Michael Gauthier's presentation on Rainwater Reclaim, David will "fill in the blanks" with regard to the filtration and pump controls involved in these highly adaptable systems.

WANTED

Looking for a **plumbing designer** with 5 years experience for MEP firm in Virginia. If you are available or know of anyone, please contact Nancy Benamati at:

Benamati & Associates * Recruiting Professionals
5239 Copperleaf Circle * Delray Beach, FL 33484
561-865-2352 * nben@att.net * www.benamatiassociates.com

April Vendor Program

Toilet Flushing Technologies



Pat Baker

Pat Baker has been involved with the plumbing industry for the past thirty years, working at the contractor, wholesaler and manufacturing levels. For most of his career, Pat has been involved with architects, mechanical engineers, mechanical contractors, interior designers, builders and distributors. Pat has held sales and management positions with Kohler Co. over the last twenty eight years. Pat is an active member of the United States Green Building Council, and the Southeast

Michigan Building Industry Association. He takes a technical and non-technical approach to plumbing fixtures, design, installation, and current statewide codes, in order to assure everyone has a clear understanding of the topic at hand. His techniques include Power Point presentations as well as hands-on materials to maximize the audience's understanding of the category and to ensure everyone takes away a real world application of the information presented.

Program: Understand the key questions that need to be answered prior to specifying a toilet. Know the different design styles toilets are now offered in. Comprehend the various flushing technologies available in the market today. Be aware of the codes and standards for toilets and how they impact what you specify. Understand how technology has been integrated into sanitary products and how to recommend the correct toilet that will exceed client's expectations. This is a CEU course for AIA, NKBA and IIDA.

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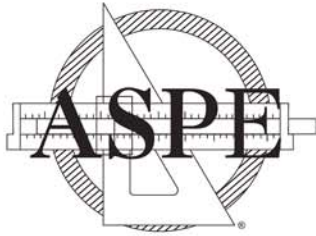
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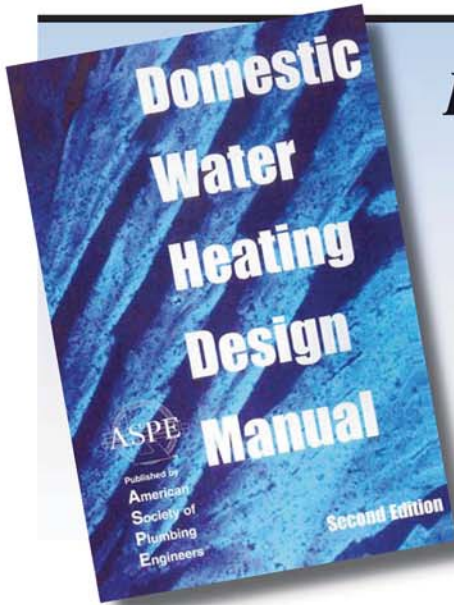
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Domestic Hot Water System Design

Tuesday, April 27, 2010

Plumbing Industry Training Center

1911 Ring Drive
Troy, Michigan 48083

8:00 AM - Registration

Includes continental breakfast

8:30 AM - 12:30 PM - Seminar

Cost: \$70 per person/ includes the manual

The first 25 prepaid registrations by present ASPE EMC members will be refunded the cost of the manual (\$30).

Non-member cost: \$100

Special Offer: \$220 gets you a membership in ASPE in addition to the seminar and manual (*SEE enclosed application form*).

Get registration form and ASPE membership application on our web site.

The Domestic Water Heating Design Manual addresses the need for standard, rational methodologies in the field of plumbing engineering. Written and extensively reviewed by plumbing engineers and designers, this book is the most comprehensive guide to the sizing and design of domestic water heating systems. It offers a rational approach to the design of cost- and energy-efficient systems for a wide variety of uses and building types. This Manual, a publication of the American Society of Plumbing Engineers, presents the most up-to-date knowledge and information.

When designing a hot water supply system the plumbing designer is faced with making many decisions and assumptions. This course will explain the different types of loads, water heating systems and sizing resources available. The course will cover load calculations, thermal expansion concerns, multiple temperature systems, re-circulation rate calculation, relevant sections of the International Plumbing Code and total system design. The designer of hot water supply systems has a variety of information resources available when designing and selecting a hot water supply system. The available references include ASPE, ASHRAE and various computer aided sizing programs from equipment manufacturers and others. The latest ASPE Domestic Water Heating Design Manual will be discussed in depth and used as the basis for the class. Participants in this course will learn how the various types of resources compute the loads for several design examples. They will compare the results and develop a sense of "practical knowledge" as well as an understanding of how the computerized selections are made. These exercises will be completed for storage type, instantaneous and semi-instantaneous water heating systems. A comparison of which type of system should be used relative to the load being served will be presented.



Alan Deal, PE, is president of Performance Engineering Group, Inc. Performance Engineering Group has been actively involved in designing and marketing domestic hot water systems, hydronic radiant heating systems since 1964.

REGISTER TODAY!

Questions? Contact Cassie Mudloff at (313) 341-7661 ext. 205 or e-mail cmudloff@mcadetroit.org. Fill in the seminar form (and Membership application) and mail with check made payable to ASPE EMC to: ASPE Seminar, 14801 West 8 Mile Road, Detroit, MI 48235

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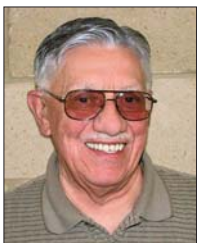
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Ed's Perspective

By Ed Hawley, CPD



VARIABLE SPEED PUMPING

The March program, presented by Reese Robinson, started by showing an end suction booster pumping package on skids, and in comparison to the three vertical multistage pumps packaged on skids booster system, plus a couple variations, and a few end suction types pump and system packaged types—

7 in total of different configurations, complete

with control panel for the necessary controls, for the speed of pumps, the pressure in PSIG, and required power.

These were the basics of electric motor pump delivery systems, followed up by a panel devoted to the “Cost of Ownership”, showing a break down of where the dollars are spent in the pumping systems: 85% for power consumption, 7% for maintenance, with only 8% for the total investment, generally speaking the cost of most systems. This is a very important fact for the selection of pumping systems.

The Hydraulic Institute panel makes a visual illustration of where each of the types of pumping systems in the schemes and the position where each type of pumping system compare for the best deliveries of total head in feet and rate of flow in gallons per minute. Reciprocating pumps, single stage centrifugal pumps, high speed and multi-stage pumps, verses the all in multi-stage pumping systems. The winner, according to the position on the pump curve, is shown to be the multi-stage pumping system, because of the efficiency percentage (%) and flow in GPM.

At this point we were introduced to the Pump Systems Assessment Tool (PSAT), a computer program to aid in making the correct selections of pumps and their position to certain Conditions A and Conditions B, to the Documentation column, a quick way of pumps selections.

A couple of good books on pumps can be ordered online: *Variable Speed Pumping Guide* (www.pumps.org), and *Pump Life Cycle Costs* (www.europump.org).

VFD Pump Control—Why variable speed control? 1. Reduced energy costs, 2. Reduced maintenance costs, 3. Longer system life, 4. Better process control, 5. The increased comfort.

Drives, in particular, can be continuously adjusting the speed of a motor to match what is required. Provide a gentle ramp up to speed to eliminate the surges caused by starting a motor both electrically and hydraulically. Provide a gentle ramp down in speed to eliminate the surges caused by stopping a motor both electrically and hydraulically. Monitor and protect the motor.

The list of available “drive” terminology controllers was discussed: a) Variable Frequency Drive (Vbfd), b) Variable Speed Drive (VSD), c) Adjustable Frequency Drive (AFD), d) Adjustable Speed Drive (ASD), e) Frequency Converter, f) Inverter, g) AC Drive, h) or just plain “Drive”.

Other key points: The application of a pressure boosting system, for a potable water supply to multi-story buildings. The necessary

collection of data for a pump curve selection. Provide 1000 gpm, with the design head of 75 feet. Let's us develop a performance pump curve. We generally can allow plumbing head losses of about only 5% of the total head. Of the 75 feet total head, 20 feet is the variable head (friction + suction pressure variations). City supply of 31 psig is available. Discharge pressure will be 65 psig. Allow for 40 psig delivered to the 5th floor elevation. Sorting thru 5 options, we have selected option 4.

Pump speed 1750 (rpm), pump efficiency at (83.71%), (NPSHr 10.1), max.(24.8 bhp), (89.80 %) max. Diameter, sized for (5” dia. Suction x 4” dia. discharge) pipe size. Hydraulic (pump) efficiency ranges between 75-80% along the control curve. The demands on the system enter flow profiles of 5 duty points, ranges from (300 gpm at 57 feet to 900 gpm at 71 feet) required TDH feet, hours per day (5.0 for the highest to 1.0 for the lowest) a total 15 hours per day operation for the duty points. Having a grand total of operating 3,750 hours per year. Compiled data, operating brake horsepower, 5.7 bhp for 300 gpm flow, to 20.2 bhp for 900 gpm flow. Pump efficiency flow of 300 gpm 75.8%, to flow of 900 gpm 80.3%.

Use of energy, with flow of 300 gpm for 6,322.3 (kwh), flow of 900 gpm for 4274.1(kwh) totals 31,375.8 (kwh), for the year.

Final PUMP option no. 4 is 1,750 rpm, 78.09% efficiency, (27.2 NSPHr), max. power (24.2 bhp), (92.69%) max.diameter, pump size (5in dia. suction x 4in dia. discharge). This unit will have three vertical multi-speed pumps with a Variable Speed Drive Controller (VSD), packaged type on skids complete.

The Basics

Water horsepower (a.k.a. hydraulic horsepower)

$$P_1 = whp = \frac{Q \times H \times SG}{3960}$$

Q = Flow in gpm
H = Head in feet

Brake horsepower (Pump Shaft)

$$P_2 = bhp = \frac{Q \times H \times SG}{3960 \times \eta_{pump}}$$

SG = Specific Gravity of liquid

η = Pump Efficiency (Greek symbol “eta”)

Electric horsepower (Input Power)

$$P_3 = ehp = \frac{bhp}{\eta_{driver}}$$

η_{driver} = driver efficiency

$$P_4 [kW] = ehp = \frac{bhp \times 0.746}{\eta_{motor} \times \eta_{drive}}$$

The Affinity Laws

For variations in speed

$$\text{Flow is proportional to speed} \quad > \quad \frac{GPM_1}{GPM_2} = \frac{RPM_1}{RPM_2} \quad > \quad GPM_2 = GPM_1 \left(\frac{RPM_2}{RPM_1} \right)$$

$$\text{Head is proportional to the square of the speed} \quad > \quad \frac{TDH_1}{TDH_2} = \left(\frac{RPM_1}{RPM_2} \right)^2 \quad > \quad TDH_2 = TDH_1 \left(\frac{RPM_2}{RPM_1} \right)^2$$

$$\text{Horsepower is proportional to the cube of the speed} \quad > \quad \frac{BHP_1}{BHP_2} = \left(\frac{RPM_1}{RPM_2} \right)^3 \quad > \quad BHP_2 = BHP_1 \left(\frac{RPM_2}{RPM_1} \right)^3$$

When TDH₁, RPM₁, and TDH₂ are known:

$$RPM_2 = RPM_1 \sqrt{\frac{TDH_2}{TDH_1}}$$

continued on page 6

ASPE EMC March Meeting

A big THANK YOU to Cindy Zatto, our photographer, for providing photos.



Ed's Perspective

continued from page 5

Additional important considerations:

1. Maximum design flow (GPM)
2. Inlet pressure (max./min.)
3. Discharge pressure (system pressure)
4. Type of service
 - ▶ Apartment buildings (flow profile)
 - ▶ Office building
 - ▶ Cooling tower make-up etc.
 - ▶ Factories etc.
 - ▶ Chemical plants
 - ▶ Pharmaceuticals plants
 - ▶ Colleges and schools
5. Power supply (VERY IMPORTANT with VFDs)
3 / 60 / 208 ...3 / 60 / 460 Voltages
6. Environment
 - ▶ Indoor/Outdoor, min./max. Ambient temp.
 - ▶ Installation space (footprint, existing pipes etc.)
7. Backup pumps? (Redundancy)
8. No flow shutdown?

There were other examples of pump curves and performance curves, that were important to this program, however much more than extra space will allow.

Therefore, I can only say that those of you who missed the program, for the next one, all should make an extra effort to attend and you will not feel you are missing something not in the report.

Edwin Louis Hawley, CPD

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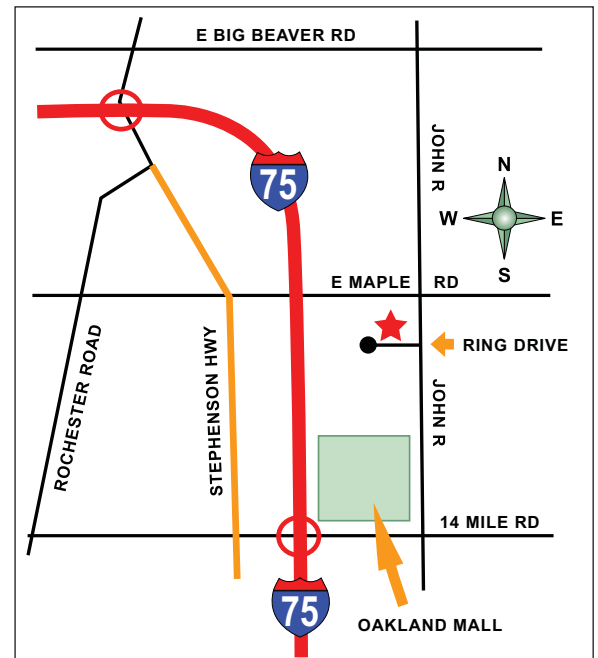
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Map to the Plumbing Industry Training Center
1911 Ring Drive - Troy, MI
West of and off John R, north of 14 Mile Rd.



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