A PUBLICATION OF THE WISCONSIN CHAPTER OF ASHRAE Year 2013-14 –September., 2013

THE BADGERAIRE

AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS, INC.

ASHRAE Shaping Tomorrow's Built Environment Today

September 19, 2013: Back to the Basics for Control Systems

Back to the Basics for Control Systems

Control Loops and tuning from the most basic concepts to advance control algorithms. This talk emphasizes how the fundamental principles apply across a wide range of systems.
What is feedback? Accuracy, stability, instability and how they come about.
Control algorithms: PID, “adaptive control” and “demand based control”.
Specifying, achieving and documenting control loop performance

- Presenter: Jim Coogan - Siemens
- Location: Joey Buona's
- Time: 5:30 - 6:00 pm Social Hour, 6:00-7:00 pm Presentation by Jim Coogan

http://www.ashrae-wi.org/reservations.html

President's Column September 2013

Hello WI Chapter,

I want to welcome all of you to the start of a brand new season. As the new WI Chapter of ASHRAE President, I would like to introduce to you my theme for the year, SERVICE. We the Board of Governors are here to serve the industry that serves us, so please do not hesitate to give us feedback on anything that we are doing for/as the Chapter. Your voice is extremely important.

In the month of August, we held a Roundtable Discussion with local HVAC industry leaders at The Best Place at the Historic Pabst Brewery. The intent of the meeting was to get feedback from Principal's, Department Heads, and other industry leaders as to how we are doing, what more can we do, and what we do well as a Chapter. A summary of the meeting is included later in the Newsletter.

We have a great program schedule developed for this year, with topics ranging from HVAC controls to Integrated Design. Our schedule includes (2) two Distinguished Lecturers. We'll continue to mix up the meeting times, having lunch and dinner meetings throughout the year. Thanks be too our Vice-President for his all his efforts.

There have been some changes in the Board of Governors over the past few months. The Chapter has a new Historian, Past-President Tim Pann. Our new Chapter Treasurer for the year is Mike Anderson. We say good bye and give a big thanks to Randy Sikkema for all his efforts as the Research Promotion Chair. He will be greatly missed! This leaves the Chapter with a vacant position. If anyone is interested in volunteering for this position, please contact me at jleffingwell@hga.com.

The current Board of Governors (Officers & Committee Chairs) is as follows:

President – Jason Leffingwell

Vice-President – Jason Nenonen

Secretary – Jared Wasielewski

Treasurer – Mike Anderson

Chapter Historian – Tim Pann

CTTC Chair – Ryan McNally

Student Activities Chair – Dave Schneider

YEA Chair – Andy Brophy

Membership Promotion Chair – Chris Staab

Refrigeration Chair – Phil Golden

Newsletter – Brian Lynch

Online Communications – Joe Carmichael

G.A. Larson Scholarship Chair – Dan Young

Kickball Tournament Chair – Mike Jahner

Golf Outing Chair – Joe Schmidt

We are always looking for volunteers to be a part of the Board or to simply assist any of the Committee Chairs and/or Officers.

As I mentioned in the beginning of this column, my theme for the year is SERVICE. I have some big shoes to fill regarding this. Some of you may or may not know, but last year I took a leave of absence from the Board as Vice-President due to medical issues with my wife and unborn son. This required us to relocate to Camden, New Jersey for nearly 6 months. While I was gone, Tim Pann, our Past-President absorbed the responsibilities of my Vice-President position; what a great ACT of SERVICE. Throughout this year, we on the Board will perform our own ACTS of SERVICE, for the Chapter, local industry, and community. There will also be opportunities for all of you to be a part of these.

There is a lot to look forward to this year. We look forward to seeing you at next week's Chapter Meeting, "Back-to-Basics," with Distinguished Lecturer Jim Coogan.

Have a great month!!

Jason Leffingwell

President of "The" Wisconsin Chapter of ASHRAE

ASHRAE Roundtable Event

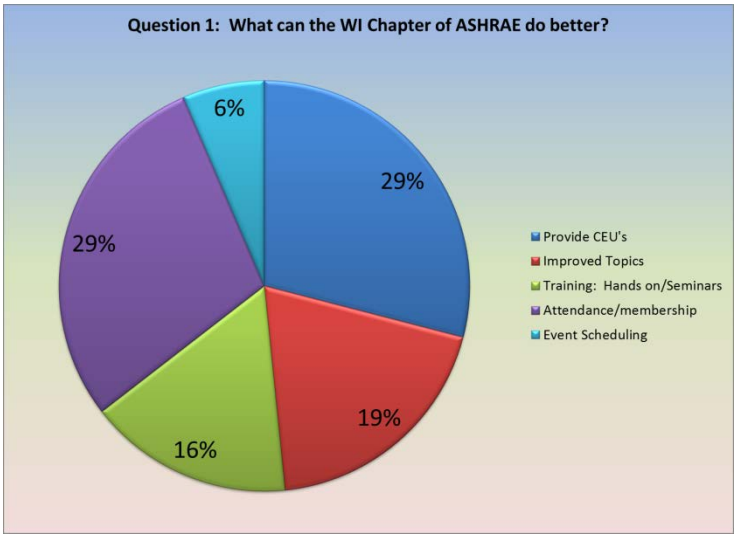
As mentioned in the President's Column, we held a roundtable event with local industry leaders. They took time out of their busy schedules to help the Chapter better SERVE the industry that SERVES us. At this time I want to thank the following for attending:

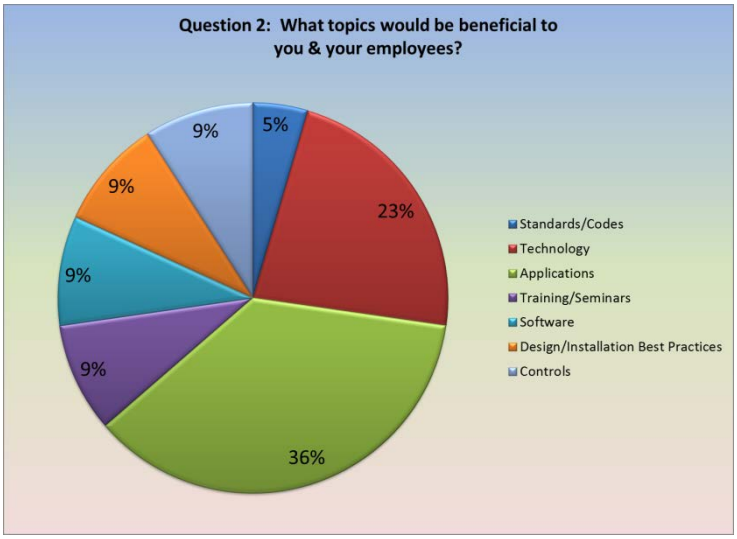
- Dennis Braun
- Jeff Weis
- Rick Hombsch
- Nick Zwaska
- Bob Bayne
- Tom Gelin
- Tim Pann
- Robert Feind
- Jeff Kuhnke
- Joe Curtes
- Chuck Sachs
- Dan Schmitz
- Joe Carmichael
- Ryan McNally
- Mike Anderson
- Chris Stipe
- Bob Lex

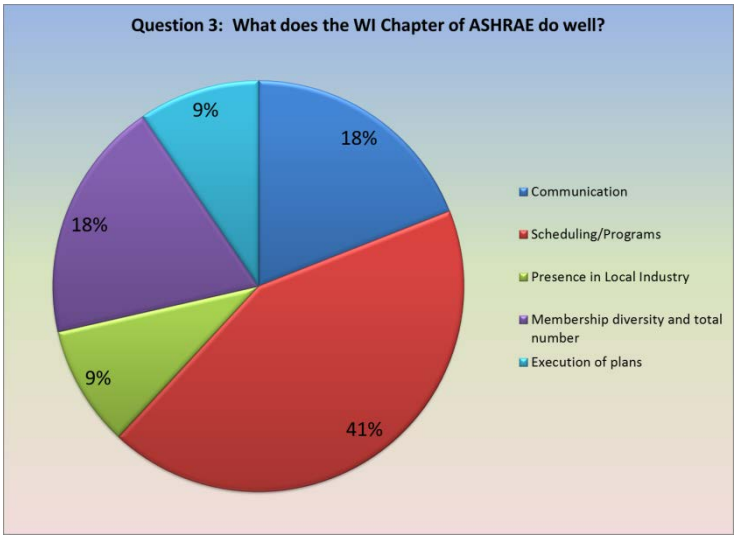
We wanted to get their feedback on how we could better SERVE the Chapter Members. My goal is to increase membership attendance at monthly meetings by 50% simply by using the feedback they provided us. This meeting had actually been in the planning stages for quite some time. It finally came to fruition. We asked the following questions:

1. What can the WI Chapter do better?
2. What topics would be beneficial to you and your employees?
3. What does the WI Chapter do well?

The pie charts in the adjacent column summarize the results/feedback that we received from those in attendance.







How and what are we going to do with this information? Well, in the upcoming months and throughout next year, we will do our best to address all of their comments, suggestions, and concerns so that we can better SERVE you. This will be done by program scheduling, additional seminars/training opportunities, and building upon those items that we already do well. The meeting was the first of what we hope will become reoccurring even every few years. If any of the Members have their own suggestions please forward them to Jason Leffingwell, jleffingwell@hga.com.

2013 Student Design Project Competition

Congratulation to the Milwaukee School of Engineering's (MSOE) student design team. The ASHRAE Integrated Sustainable Building Design (ISBD) competition was integrated into the senior design project for a section of the MSOE Students participating in the Architectural Engineering and Construction Management Senior Project. The team finished 3rd overall within the ISBD design category and a representative of the team and the teams advisor will be making the trip to the 2014 Winter Conference in New York, which is scheduled for January, to accept the award.

The Integrated Sustainable Building Design competitions goal is to challenge the students to go beyond their knowledge of the core mechanical systems and look at creative engineering solutions and system approaches. For the 2013 competition, the project centered around a 100 foot by 100 foot lot in Dallas, Texas. The site is the location of a historic high-rise building, which currently serves as an apartment building. The students reviewed the building for energy consumption and programming needs and were given the choice of re-using the building or demolishing the building and constructing a new building in its place. A conceptual energy model followed to analyze the building and to determine if it met the competitions overall goal of approaching net zero energy use.

Dallas Power and Light Building

Students Showcase Sustainable, Innovative Practices as Part of Design Competition

ATLANTA—This year, in addition to the Student Design Competition, ASHRAE asked students to think outside the box with the new Applied Engineering Challenge, which invited students to design a portable refrigeration unit.
The Applied Engineering Challenge is part of the charge from Presidential Member Tom Watson, who put forth that ASHRAE broaden its horizons by making accessible technology for use in any country, by any person.

The Engineering Challenge stipulated that students design a refrigeration unit with a holding volume of 1 ft.^{3} that could transport small essential cargo, such as food or medicine. The temperature inside the box must be maintained at 25 F without an external power supply and the device must be able to be assembled anywhere in the world.

The first place Applied Engineering Challenge winners are Brian Kaufman, Nick Leeburg, Tony Lin and Micah Reich of San Jose University, Calif. Their faculty advisor is Nicole Okamoto, Ph.D.
The team chose a simple wooden frame for their freezer unit due to the simplicity of fabrication and availability of the material. As refrigerant, HFC-134a was used for its less detrimental impact to the environment compared to chloroflurocarbons (CFCs). The freezer utilizes a swing motor compressor which allows the device to work while in transit, making the freezer more durable and able to handle vibration and changes in orientation. At just 65 lbs, the freezer can easily be carried between two

people.
Also critical to the freezer's design is the solar panel and self-adjustable rack that allows a user to gather the maximum amount of sunlight. The solar panel powers an absorbed glass mat battery, which was chosen for its reliable track record in the solar industry and relative lower cost in relation to cycling life. The battery requires little maintenance and provides increased safety to the user—safety such as drop protection and no spilling of acid if broken.
ASHARE also announces the winners of the 2013 Student Design Competition, which recognizes outstanding student design projects, encourages undergraduate students to become involved in the profession, promotes teamwork and allows students to apply their knowledge of practical design.
This year's competition featured a mock design of a high rise residential building, with retail space on the lower floors, in Dallas, Texas.
Among the 41 entries from eight different countries, three were awarded first place in the three categories that the competition offers.
First place in HVAC Design Calculations is awarded to Jayson Bursill, Natasha Palmer, Angela Walton and Gavin Wong of the University of British Columbia, Vancouver, B.C., Canada. Their faculty advisors are Nima Atabaki, Ph.D., Geoff McDonell and Steven Rogak, Ph.D.
Limited mechanical space available for large plant equipment and exhaust ducting resulted in the team selecting an air-cooled heat recovery chiller for the roof and high efficiency condensing boilers for heating. Heat recovery was implemented via air-to-air heat pipes, which provide minimal leakage and are a passive technology, and allow for washroom exhaust recovery. Hydronic radiant panels were used for skin heating in the first floor retail space to lower the room air temperature and maintain occupant comfort.
The team used Ottawa, Ontario's climate when considering weather conditions and found, when compared to the Standard 90.1-2010, *Energy Standard for Buildings except Low-Rise Residential Buildings*, baseline, the design is 8 percent more efficient given the constraints on mechanical space and terminal unit selection for the Ottawa climate.
Analysis of the cost of installing the necessary equipment for the heat recovery chiller gave a payback period of 13 years and a net present value of $3,358 over the life of the building. This is with the consideration of additional piping costs and the fuel (natural gas) savings for when the chiller waste heat production was equal or greater than the building heating load so the boiler could be turned down.
As an alternative energy conservation measure, the team chose triple-paned windows. The energy savings from adding an additional inert space between the environment and the conditioned space are undeniable. It was found that the use of moderately tinted triple-paned windows would reduce heating and cooling equipment size by 14 and 25 percent respectively.
First place in HVAC System Selection is awarded to Garrett Elder, Nathan Love and Nick Theimer of Kansas State University, Manhattan, Kan. Their faculty advisors are Fred Hasler, P.E., and Julia Keen, Ph.D., P.E., ASHRAE-Certified High-Performance Building Design Professional.
After considering several systems, the team chose a water source heat pump (WSHP) with sewage heat exchanger (SHX) for the building. A water source heat pump allows for load sharing between spaces within the building via a common water loop; it is an extra benefit that helps to improve the efficiency of the entire building's heating and cooling system. The system also has the potential to be self-balancing due to the fact that simultaneous heating and cooling will occur during the year.
The addition of the SHX to the water loop provides conditioning to the loop prior to activating the boiler and fluid cooler. The system takes advantage of the fairly consistent effluent (i.e., wastewater) temperature range between 52 and 75 F. This range allows the effluent to be used as a heat source or heat sink for the building's central water loop. The SHX also consumes the lowest amount of energy when compared to other systems.
Ultimately, the students based their decision on the Triple Bottom Line (TBL): profit, people and planet. Though the WSHP with SHX has a higher initial cost (profit) than other suggested alternatives, the cost did not prove to be a deterrent when the students considered the many other requirements for the systems, such as low impact on energy and water usage and strict acoustic criteria. For the second factor, "people," the team found that the innovative SHX allows the building and its owner to ultimately be an example and leader for sustainable energy in its region. Finally, when considering "planet," the students explain how the system affects the environment: "the fact that the SHX can provide the required capacity acting as a heat sink or heat source from a renewable energy source sets this system apart."
First place in Integrated Sustainable Building Design is awarded to Jiayi Qiu, Dalin Si, Yukai Wu, Zhongzhe Wu, Ruijun Zhang, Zhiang Zhang and Xuyang Zhong of the University of Nottingham, Ningbo, China. Their advisor is Ed Cooper.
The students redesigned the building and relocated it to Ningbo, China, on a greenfield close to basic services as stipulated by Standard 189.1, *Standard*

for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings. They considered passive cooling strategies such as shading in summer and natural ventilation in May, June and September. The students also explained that increasing solar heat gain and use of high thermal mass material will also contribute to thermal comfort in winter time.

For shading on residential areas, the students suggested photovoltaic devices and a double-skin façade. The façade would have one panel each and generate 22,468 KWH/year. Similar panels on the retail portion of the building would generate 7,270 KWH/year.

A closed vertical loop system was selected for the ground side circulation. Due to the space restriction, the W-type of buried pipe was chosen to increase the area of heat exchanger with ground soil in per borehole, with 240 boreholes in total.

The projects are shared at the 2014 Winter Conference in New York City, Jan. 18-22.

ASHRAE, founded in 1894, is a building technology society with more than 50,000 members worldwide. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today. Learn more at www.ashrae.org.

Membership Promotion

Our ASHRAE Chapter is always looking for more members. Please consider inviting a guest to join you in coming to any of the upcoming meetings. Show off what a great organization this is!

Remember to get your dues paid before the end of the year so you can take the tax deduction. It's just one more benefit of being an ASHRAE member.

Are You An Associate Who Wants to Advance to Member?

To advance from Associate to Member, you must update your ASHRAE bio online, and notify membership@ashrae.org you have updated your bio and wish to be considered for grade advancement.

Reasons to Advance ASHRAE Membership:

1. Prestige
2. Chapter recognition through newsletter
3. Chapter recognition at meeting
4. To serve on a technical committee
5. To serve in a chapter officer role
6. To serve in a regional role
7. To qualify for ASHRAE Fellow and other Society awards
8. You can add Member ASHRAE to your email tag
9. Allows your chapter to shine among other chapters
10. Society recognition in Insights

Steps for updating your biography:

1. Go to the ASHRAE home page and login;
2. Look for Member Central (Member Central is located under the top left-hand column below the Login box);
3. Click "Update Your Bio";
4. Click on the link "Edu. Pro. Reg" located in blue font above your name to add all of your educational history, relevant professional licenses and work history;
5. Confirm your contact information is current by clicking on "Contact Info";
6. Once you have updated your biography, send an email to membership@ashrae.org with your Member ID number (which can be found by clicking on "Bio Info") requesting advancement.

Upcoming Chapter Meetings-Mark Your Calendars!

Meeting Date	Topic	Speaker	Location	Time
9/19/2013	Back to Basics for Controls	Jim Coogan	Joey Buona's	5:30-7:00pm
10/17/2013	Low Temperature Refrigeration	Dale Kuhlman	Hilton Garden Inn 11600 West Park Place – Milwaukee	5:30-7:00pm
11/14/2013	VRF w/ DOAS	Ryan Hoger/Robert Fiend	J.F. Ahern Co. 3201 Canal Street, Milwaukee	11:30am-12pm
12/12/2013	TBD	TBD	TBD	TBD

Other Chapters

For details regarding ***surrounding chapte***r meetings see:

- Northeast Chapter http://www.newisconsinashrae.org/
- Madison http://www.ashraemadison.org/
- Illinois www.illinoisashrae.org.

Wisconsin Chapter Officers and Committee Chairs

President	Jason Leffingwell
Vice President	Jason Nenonen
Secretary	Jared Wasielewski
Treasurer	Mike Anderson
CTTC Chair	Ryan McNally
Refrigeration Chair	Phil Golden
Membership	Chris Staab
Research Promotion Chair	**VACANT**
Student Chapter Coordinator	Dave Schneider
Historian	Tim Pann
Newsletter Chair and Editor	Brian Lynch
Online Communication	Joe Carmichael
YEA	Andy Brophy
Special Activities	Mike Jahner
Golf Outing	Joe Schmidt
Scholarship	Dan Young

Wisconsin Chapter of ASHRAE