Post Time

October 2018 | ASHRAE Bluegrass Chapter – Monthly Newsletter

ASHRAE Grand Prix Go-Kart Racing

November 29th 3:00-5:30 PM

MB2 Raceway: 2040 Creative Dr, Lexington, KY 40505

Racing includes:
14 Lap Qualifier
14 Lap Main Event (grid start)

Proceeds go to ASHRAE Research Promotion

Package Options:

4 Person Team Sponsor: $300
**Includes 4 racer fees, sponsor recognition on Bluegrass ASHRAE website, and on-site recognition at MB2 Raceway*

Individual Racer Sign-up: $75

Contact Andrew Jenkins to reserve your spot now!
Phone: 859.227.9102 or Email

Next Month's Meeting

****Please note new location****

Due to increased attendance at the monthly ASHRAE luncheons, we will be trying out a new venue for the month of November. The November chapter meeting will be held at Thermal Equipment Sales, **680 Bizzell Dr, Lexington, KY 40510**. This location will allow us to have more food options and more space.

Overview of Risk Management for Infection Control during Healthcare Construction

Come to Thermal Equipment Sales on November 7th for a talk from ASHRAE Distinguished Lecturer Marlene Linders!

This presentation addresses the following:

- How Healthcare Associated Infections are changing the safety and financial factor for hospitals
- How construction contributes to Healthcare Acquired Infections and adds risk to the project
- Healthcare organizational goals--Do you as a professional meet them?

Stay tuned for a meeting announcement going out later this week! You can also register here.

In This Issue:

Message from the Historian

By Baalaganapathy Manohar, LEED AP

This is an Extract from the January 1999 Issue of the ASHRAE Journal by Bruce L. Flaniken, P.E. Member ASHRAE:

Application of Electric Power In HVACR Systems

Prior to the late 1800s, rotating shaft power was limited mainly to trains and ships. There were wind and water mills for pumping water and grinding grains and some steam-driven water pumps and ventilation fans. However, few people lived in windy regions or near fast-moving streams. Some ventilation fan designs for mine shafts were powered by man, wind or water pressure.

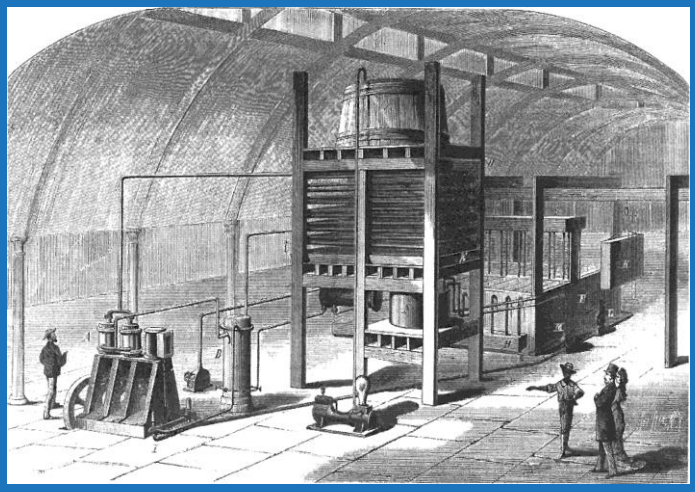
Early Refrigeration

Refrigeration was provided by ice from frozen ponds and rivers in the more northern climates. This ice was harvested and stored in winter and then sold during warmer weather. Ice trade became a major industry in the United States. Frederic Tudor of Boston started shipping ice to warmer climates in 1815. He became known in 1864 as the "Ice King of the World," and Boston ice was shipped to every major seaport in South America, the Far East, China, the Philippines, India and Australia.

As pollution around the cities increased, particularly in the form of sewage run-off, the market emerged for artificial ice. Use of steam boilers to drive the thermodynamic process cycle and produce ice was growing rapidly. Daniel L. Holden and J. Andrew Muhl built and operated mechanical refrigeration plants in 1865 and 1867 in San Antonio, Texas. Holden designed improvements to the Cane absorption units of Paris, which made San Antonio in 1867 and New Orleans in 1869 the southern regional leaders in making artificial ice.

The areas that could harvest "natural" ice tried to convince people that the "artificial" ice was somehow unnatural and to be avoided. But the areas that were producing manufactured ice were able to convince people that "natural" ice was contaminated. As costs came into line with the natural ice costs, producers of artificial ice were able to make significant inroads into the northern monopoly on ice.

Ice delivery was hard work. Imagine lugging around a 300 to 400 lb (140 to 180 kg) block of ice on your shoulder! By 1909, ice was produced in approximately 2,000 refrigeration plants.



Holden's improved ice plant. The structure in the center is a condenser with a "zig-zag" heat exchanger (from Scientific American, May 22, 1880, p. 322).

Heating: From Stoves to Steam

Heating was provided by wood-burning fireplaces, which were later replaced with cast-iron radiant stoves that burned wood and/or coal. As cities became more populated, fire control became much more important. Fireproof construction was mandated by some city codes after several large and costly fires destroyed central districts.

Steam boilers became a standard for heating buildings. Central district steam plants that sold steam to buildings were developed. The steam boilers were large and expensive to operate and required supervision and maintenance. Coal-handling bunkers and stokers also constituted a portion of the overhead.

As steam-driven engines developed as a reliable means of rotating shaft power and heat sources, they began to be used as the power source for refrigeration and ventilation systems. Of the steam engines used for this purpose in 1914, more than 90% exceeded 15 million calories/hour (63 MJ).

Facilities that had a large steam boiler used the steam to provide for ventilation with large, low rpm centrifugal fans because they could convert the steam to rotary shaft work. Smaller, steam-driven piston engines were developed for the purchasers of central district steam to convert steam to rotary shaft horsepower for all manner of equipment.

Continued…

Wood- and coal-burning steam-driven vehicles were developed in the late 1890s. An experienced operator could achieve sustained vehicle movement or sustained rotation of the steam-driven power take-off wheel from a cold start after about 1 1/2 to 2 hours of hard work. The engines were quite powerful, but they weighed several tons. The Stanley Steamer automobile was fairly impressive in appearance, size and speed.

Early Ventilation

In other areas, ventilation was almost non-existent. Natural ventilation was controlled by the building orientation and placement of windows to catch the prevailing breezes. High ceilings and large, open central staircases with ventilated domes provided some assistance to gravity and Mother Nature. Ventilation did not truly take off until after the mid-1880s, when the use of steam and electricity had spread. An exception was a kerosene-powered fan sold by the Whirlwind Fan Company. The sales slogan for this unit boasted, "It will give you greater efficiency and enable you to do more and better work."

The electrical industry was growing rapidly. New patents and ideas for residential electrical appliances were being advertised as the best or most natural way of life. The world was rather unsophisticated and uneducated, but some of the biggest changes to affect humankind were taking place. The development of steam and electric-powered equipment surged ahead due to better understanding of electrical, mechanical and thermodynamic principles.

Direct or Alternating Current?

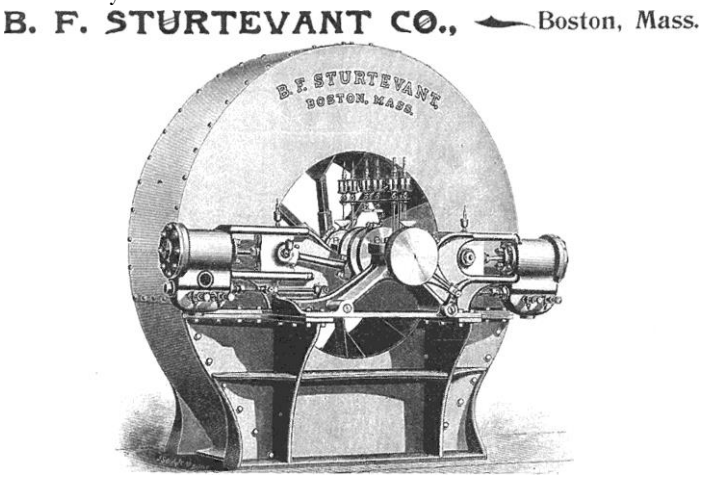
The competition between direct current (DC) and alternating current (AC) was fierce. Thomas Edison was a prime proponent of DC power because of his involvement in the design and marketing of direct current lighting, power distribution and motors. He felt that AC power was only good for electrocutions. DC power did provide a flicker-free light and could vary the speed of a motor by varying the voltage. Its major drawback, however, was its inability to transmit via wire over long distances.

George Westinghouse, Jr. was the principal proponent of AC power. The flicker problem with incandescent lighting was resolved by using more cycles per second, ranging from 133-1/2 to 25 cycles per second. The various voltages and cycles for AC power transmission were being tested, and the ones that worked best were retained. By 1914, most frequencies above 60 cycles per second had been abandoned, but it took another 20 to 25 years for 60 cycles per second power to become the standard in the United States. Some other countries settled on 50 cycles per second.

Generally, the only electrical load of a central power generator plant was the street lighting at night in the central business district. Some single-phase, induction-type motors with brushes and commutators became popular, especially among small industries in suburban towns.

Use of small electric fans, curling irons, irons for laundry, washing machines and hair dryers increased the use of electric power, particularly during the idle daytime period when the generators were under-utilized. This trend has reversed in the present day. Modern utility companies now offer premiums to shift the daytime power consumption to evening hours because their generating capacity is underutilized at night.

Single-phase induction and synchronous motors for AC power were popular with the public. To properly start synchronous motors, however, required experience. The power utility companies liked the synchronous motors because they could be operated with a 1.0 or higher leading power factor to help correct the lagging power factor of the utility distribution system. Automatic starters were developed later. Because it was difficult to control the motor speed, almost all the applications used belt-drive connections to drive the machinery.



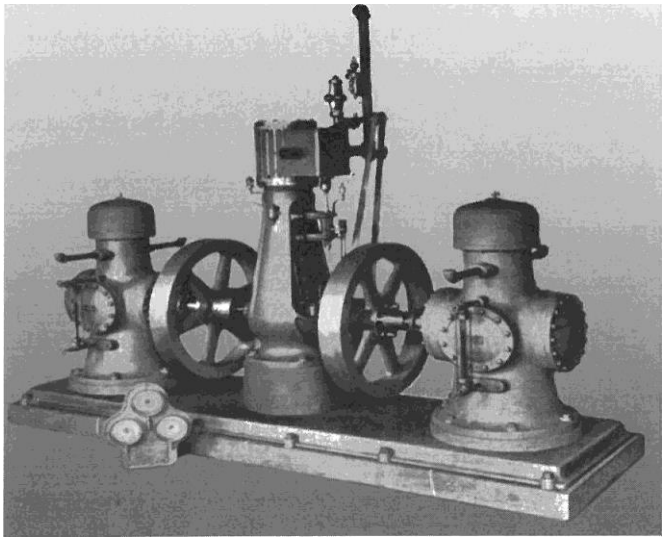
Early steam fan from B. E Sturtevant Co. **(from Heating and Ventilation, June 1895, p. xvii).**

Continued…

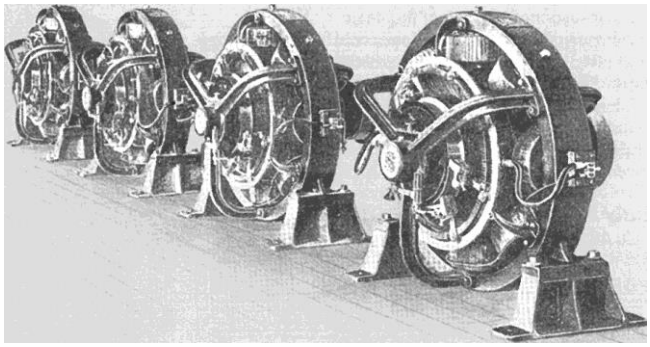
Advances in Motor Technology

The physicist and inventor Nikola Tesla began working on AC electrical designs as a college student in Croatia during the 1870s. At this time, it was thought impossible to construct a motor without a commutator. Tesla worked as a telephone engineer before quitting to develop in his mind a complete alternating current power system with generators, transformers and motors. He then took a job as an electrical engineer, but no one was interested in his seemingly incredible ideas. He developed working models of generators and motors while on a long-term assignment in Strasbourg, then part of Germany. Tesla moved to the United States in 1887, at age 31, where he filed for 25 patents covering virtually the entire field of alternating current generation, distribution and polyphase, brushless induction AC motors. Shortly after, he sold his patents to George Westinghouse, who implemented widespread use of alternating current.

Prior to 1891, there had been no demonstration of electrical transmission of any considerable amount of power over any considerable distance. A demonstration of the capability to transmit 100 hp (75 kW) of AC electricity a distance of 106 miles (171 km) from Lauffen to Frankfurt in Germany was staged in 1891 for a technical exhibition.



Two single-acting duplex compressors and steam engine direct connected (from the Victor Ice and Refrigerating Machines, 1899. Stilwell-Bierce & Smith-Vaile Co., Dayton, Ohio).



Precursor to open drip-proof motors (from* Engineering Review, *Feb. 1902, p. xxi).

The wye-connected, three-phase generators were wound for 55 volts and driven by hydraulic turbines. A transformer increased the voltage to approximately 30,000 volts.

The three copper conductors were only 4 mm (0.16 in.) in diameter each. The incoming power was stepped-down to drive a 60-hp (45-kW), four-pole poly-phase induction motor at a speed of 1,200 rpm and supplied power for incandescent lights and some other small motors."

The AC polyphase motor became more popular. The HVAC&R industry was able to capitalize on its popularity as the polyphase motor spread to small, commercial applications. Electric power costs in 1897 averaged about $0.10/kWh. The price dropped to approximately $0.03/kWh in 1950 and is now approaching $0.10/kWh again.

Society News Press Releases

ASHRAE and ASPE Strengthen Partnership with Signing of New MoU Agreement

ASHRAE and the American Society of Plumbing Engineers (ASPE) have signed a new Memorandum of Understanding (MoU) formalizing the organizations' relationship.

ASHRAE Announces New HVAC&R Student Competition

ASHRAE has announced a call for entries for its 2019 HVAC&R Student Paper Competition.

ASHRAE Learning Institute Announces Course Offerings for 2019 Winter Conference in Atlanta

ASHRAE Learning Institute (ALI) will offer 20 courses during the 2019 ASHRAE Winter Conference & AHR Expo in Atlanta.

Monthly Government Affairs Update

By Dustin Meredith, PE

In this space each month, we will provide a snapshot of federal and state government activity.

Federal legislative and regulatory activities:

- Senate Commerce Committee holds hearing on STEM Legislation
- EPA Asks Supreme Court to Drop Case on HFC Rule
- OSHA Provides Guidance on Respirable Crystalline Silica in Construction
- September 24-28, 2018 is National Clean Energy Week
- Energy Efficiency Day Set for October 5
- Funding Package for DOE, VA, and Legislative Branch Signed into Law
- EPA Proposes Limiting Parts of Obama–era HFC Rule
- IPCC Releases Report on the Impacts of Global Warming
- EPA Proposes Rule to Revise Section 608 Refrigerant Management Regulations

Additional information on each of these activities can be found here:

KY state legislative and regulatory activities:

The 2019 legislative session will begin on January 8th and will tentatively end on March 30th.

ACEEE Releases 2018 Energy Efficiency Report Card

The American Council for an Energy-Efficient Economy released its 2018 State Energy Efficiency Report Card on October 4. This 12th annual report documents progress and development in all 50 states on energy efficiency and increased power savings. The Scorecard assesses state policies and programs in six areas: utilities, buildings, transportation, state government, combined heat and power, and appliance standards. Additionally the report highlights best practices for improving energy efficiency.

Kentucky was ranked #29 which is higher than most of our neighbors with the exceptions being Virginia at #26 and Illinois at #12.

Click here to view the full report.

2019 ASHRAE Winter Conference & AHR Expo

The ASHRAE Winter Conference takes place Jan. 12-16 at the Omni Atlanta Hotel at CNN Center and the neighboring Georgia World Congress Center, where the AHR Expo is taking place Jan. 14-16. Together, the Winter Conference and AHR Expo provide you and your colleagues with ring-side seats to the latest technological developments, educational offerings, and networking opportunities.

The Conference Technical Program offers over 100 sessions within eight tracks:
Track 1: Systems and Equipment
Track 2: HVAC&R Fundamentals and Applications
Track 3: Refrigeration
Track 4: Construction, Operation, and Maintenance of High Performance Systems
Track 5: Common System Issues and Misapplications.
Track 6: The Convergence of Comfort, Indoor Air Quality, and Energy Efficiency
Track 7: Building Integrated Renewables and Natural Systems
Track 8: The Engineer's Role in Architecture

The AHR Expo will host more than 2,000 exhibitors and 65,000 industry professionals. When you register for the ASHRAE Conference, your ASHRAE badge will give you access to the AHR Expo.

Additional conference activities include technical and general tours of Atlanta, social events like the Welcome Party and Members Night Out, and of course ASHRAE Learning Institute Courses, Certification exams, and more.

It's an amazing event, and we hope you consider attending. You can easily request employer support from the Justification Toolkit. If you have questions please contact a member of the board of governers, or you can email meetings@ashrae.org.

Winter Conference Registration Costs

Conference Registration before 10/28/18

$475 – Member / $685 – Non-Member

$450 – First-time Member Attendee / $660 – First-time Non-Member Attendee

Conference Registration between 10/28/18-12/30/18

$500 – Member / $710 – Non-Member

$475 – First-time Member Attendee / $685 – First-time Non-Member Attendee

Hotel Cost

Omni Atlanta Hotel at CNN Center is the host hotel. Rates are $239 + tax.

Job Board

Rahul Aggarwal, a MSME in Mechanical Engineering from the University of Florida, is Seeking an Entry Level or a 6 month Internship Position. He currently has a LEED GA and has passed his Fundamentals of Engineering exam. He currently resides in Lexington and can be reached by phone or E-mail. He is interested in MEP Engineering and Sustainability.

Phone: 352.281.2350
Email: rhlmaggarwal@gmail.com.

Note From the Editor

By Jon Sheppard, Newsletter Editor

If you haven't already, please consider joining the Bluegrass ASHRAE chapter's facebook page located here. This will be a helpful way for me to send communications out to everybody in between newsletters. Thanks!

Are you interested in adding your company's information to the newsletter? Would you like to post job opportunities? Other articles of interest? Please don't hesitate to contact me!

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