

# ASHRAE Ottawa Valley Chapter

## Chapter Meeting #6 –March 21<sup>st</sup> 2017

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Meeting Date:	March 21st
Location:	Algonquin College
Attendance:	Total: 63
	Members: 52    Guests: 11    Students: 6
Theme:	Student Activities
Tour:	None
Tech Session:	Electrical Fundamentals
Table Top:	None
Program:	Refrigeration Energy Essentials
Speakers:	Greg Scrivener, Cold Dynamics
Prepared by:	Chris Fudge

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**Social** (17:30 – 18:10)

**Business Session** (18:10 – 18:59)

- President Abbey Saunders called the meeting to order.
- President Saunders introduced the Board of Governors and the Executive.
- Secretary Chris Fudge introduced the guests for the evening.
- Membership promotion chair Celine Baribeau introduced the new members
- President Abbey Saunders gave an overview of the tech session that was done on electrical fundamentals. The technical session was extremely well attended with thirty two in the audience. The session presenter was Jeff Siddall of Morrison Hershfield.
- Student Activities Co Chairs Adrienne Mitani and Peter Shaw-Wood gave an update on Student Activities. Career fair was very successful at Carleton University. Doug Cochrane the visiting Region II DRC (Director and Regional Chair) met with several student members from Algonquin College and Carleton and Ottawa Universities.
- President Saunders noted that the Technology Awards program deadline was extended until March 29<sup>th</sup>. President Saunders also reminded the audience that the HVAC design essentials one and two course is taking place in May.
- Nominations committee chair Bob Kilpatrick opened up nominations for the executive (secretary) and board of governor.
- Mr. Cochrane gave an update on the AHR expo in Las Vegas. 2761 people attended the ASHRAE Winter Conference. Society President Timothy Wentz main initiatives covered. New educational courses covered and recent publications and standards. He also reviewed upcoming publications. The advanced energy design guides are currently being offered for free. DRC Cochrane also recognized several Region II members who won society level awards or have been granted the member grade of fellow.
- President Saunders gave a brief overview of chapter and region awards. Mrs. Saunders encouraged members to update their members BIO as many members may qualify for an award.

- President Elect Adam Graham gave an update on membership promotion. Airtron donated Senators tickets for the membership promotion draw. Four tickets to the Sens vs Wings game. Robert Lefebvre won the draw. 510 dollars were raised for ASHRAE research through the evenings draw.
- President elect Graham gave an overview of the upcoming technical tour taking place at Dilfo's shop.

**Dinner** (18:30–)

**Evening Program** (19:30 – )

- President Saunders introduced the evening's speaker ASHRAE Distinguished Lecturer and President of Cold Dynamics Mr. Greg Scrivener.
- Mr. Scrivener encouraged the evening's guest to complete their program evaluation surveys. He also discussed ASHRAE Technical Committees and his involvement in TC's.
- Mr. Scrivener discussed some of the issues with A2L refrigerants. ASHRAE is currently doing research in this area specifically with respect to application of systems that use these refrigerants.
- The objective of the evenings presentation is review basic refrigeration cycle understand the parameters which have the most impact on efficiency. Examine technology and strategies.
- A quick look at the basics. The basic refrigeration components and the cycle were quickly reviewed in relation to the pressure enthalpy chart.
- Heat rejected, net refrigeration effect and work were also outlined on the pressure enthalpy chart.
- Coefficient of performance was reviewed in terms of cooling and heating.
- Carnot efficiency calculation was also reviewed.
- Primary and secondary factor were reviewed.
  - o Primary factor Hot cold reservoir temperatures set max possible efficiency (Carnot Efficiency)
  - o Irreversibility heat recovery cycle design, do not affect the max possible but do effect efficiency
- From the Carnot cycle it can be seen that the lower the difference in temperature between the cold and hot reservoirs the more efficient the system. A plot was reviewed that showed the effect on efficiency by evaporating temperature and condensing temperatures.
- Rules of thumb were covered every 1 degree in condensing temperature changes the efficiency by 1 %. For every 1 degree in evaporating temperature changes the efficiency by 2 %.
- What are the limits? There needs to be a difference in order for heat transfer to occur. The smaller the temperature difference the larger the heat exchanger and cost. The higher temperature difference removes more latent load and decrease humidity. Dehumidification is sometimes needed to prevent mold. On the condensing side some systems need a pressure difference to actually work properly. Similar limitations with keeping the temperature differences small.
- Related strategies.
  - o Floating head pressure
  - o Floating suction pressure similar to doing chilled water reset.
  - o System / cycle design
- Cycle design. There are many things we can do to the cycle to make it more efficient.
  - o Sub cooling
  - o Intercooling and flash gas removal

- Two stage compression
- Cascade
- Expanders
- Ejectors
- Etc.
- Sub cooling. There are many ways to get sub cooling. The result is increased net refrigerating effect.
  - Mechanical sub coolers
  - Ambient air
  - Melt pits
  - Etc...
- Irreversibility's. As with any cycle, we can't make it perfect.
- How important is pressure drop?
- Pressure drop in the suction line and through valves in the suction line has one of the largest negative effects on a refrigeration system. Remember the 2 % rule of thumb.
- Example: a R407a freezer suction line has the equivalent of 2 F suction pressure and evaporates at - 20 F. There is a suction drier installed in the suction line and measure a 2 psi pressure drop across the drier.
- Total pressure drop is 3.1 psi or 6 % increase in power required.
  - Actual is 7.9 %
- Putting it all together.
  - The total system COP depends on many other factors.
  - What did it cost to get the sub cooling?
- Combined COPs and heat recovery. Be very careful about marketing material and combined COPs. Make sure the cost of doing the heat recovery is looked at terms of actual operating conditions and other ancillary devices.
- Conclusion. There are many ways to save energy in refrigeration systems. Condensing temperature and evaporating temperature. Cycle design and modifications. Operating
- Small update on CSAB52. With some of the changes coming in respect to A2L refrigerants there are some significant holes in the code were flammable refrigerants will be in seen in a residential setting. The enforcement arm of the code currently does not enter into the residential area.
- President Abbey Saunders thanked the speaker and presented them with a gift.