ASHRAE Ottawa Valley Chapter
Chapter Meeting #2 – 21 Oct 2014

Meeting Date:	21 Oct 2014
Location:	Restaurant International – Algonquin College
Attendance:	Total: 51
	Members: 44 Guests:6 Students: 1
Theme:	Membership
Tour:	None
Tech Session:	1hr Tech Session on refrigeration and compressor technologies
Table Top:	Hydro Ottawa Data Aire sponsored by Master PoolPak sponsored by Total HVAC
Program:	**Natatorium Design**
Speakers:	Mark Palitza, Seresco Technologies
Prepared by:	Adam Graham

Tech Session (16:15 – 17:15)

Social (17:30 – 18:15)

Business Session (18:15 –18:30)
- President Steve Moons introduced the Board of Governors and Executive.
- Adam Graham introduced the guests for the evening.
- Adam Moons welcomed new members.
- Adrienne Mitani introduced this month's student theme and discussed future career panel that she is organizing as well as updating membership on new Algonquin student design team.
- Steve Moons gave recap of stroke play golf tournament. Peter Nabi won with a score of 76.
- Steve Moons reviewed today's tech session topic.
- Hydro Ottawa Table Top display was introduced by Kevin Quinlan.
    - $710M in incentives were issued in Ottawa area in the past 4 years.
    - Incentive program has just been extended for next 6 years.
- Master Table Top display of Data Aire was introduced by Chris Fudge.
- Total HVAC Table Top display of PoolPak was introduced by Andrew Douma.
- Senators tickets were donated by Engineered Air and raffled off raising $410 for ASHRAE Research.

Dinner (18:30 – 19:40)

Evening Program (19:40 – 20:50)
- The evening program presentation commenced with Mark Palitza of Seresco introducing himself and his presentation on Natatorium Design.
- The presentation was started by showing several photos of natatorium design gone wrong.
- Multiple possible issues we introduced:
    - No vapour barrier
    - Suspended ceiling in pools
    - Stainless steel materials in pools (don't use in load bearing applications)

        - Efflorescence (moisture forced through structure and evaporates, leaving minerals behind)
- Introduced Sterling chart showing how relative humidity can impact occupant health.
    - Optimal RH is between 40% and 60%
- Design Issues
    - Discussed dew point concept
        - Dew point is the temperature at which moisture will condense out of the air
        - Any surface with a temperature below the dp will allow condensation
        - 82F/50%RH → 62F dew point
    - Evaporation occurs from a differential in vapour pressure at the water surface to the the vapour pressure of the air at its dew point.
    - Evaporation rate calculation: ER = 0.1 x A x AF (Pw – Pdp)

      ER = evaporation Rate of water, lb/h
      A = area of pool water surface, ft2
      AF = Activity Factor
      Pw = saturation vapor pressure at water surface, in. Hg
      Pdp = partial vapor pressure at room dew point, in. Hg
        - 2 scenarios must be checked for greatest load
            - Occupied, AF=1 and RH of 60%
            - Unnocupied, AF=0.5 and RH of 50%
        - Allowing reasonable RH increase under high activity allows for reduction in equipment size and energy savings
    - Introduced typical design conditions and activity factors for various applications
        - Emphasized the importance of proper owner expectations of pool use in sizing dehumidification equipment and air distribution
    - Olympic pool example given
        - Emphasized that an increase in air temperature will reduce heat loss due to evaporation.
- Energy consideration
    - Rule of thumb for air temperature is 2F warmer than pool water temperature
- Condensation control
    - Dew-point is critical
    - 3-5cfm/ft2 glass, 5cfm/ft2 skylights
    - Diffuser type and locations are critical
- Moisture migration control
    - Maintain negative pressure inside pool relative to outdoors and adjacent spaces.
    - Vapour barrier is essential and location should be on high moisture side.
- Pool water quality
    - Largest IAQ concern (due to chloramines)
    - Improved with proper water chemistry, UV, increased OA and EA rates
- Addressing the IAQ concern
    - OA = 0.48 cfm/ft2 + 7.5 cfm/spectator (approx. double OA for water parks)
    - EA ~ 1.1 x OA (approx., to maintain 0.05-0.15" wg negative as per ASHRAE Applications Chapter 4)
    - Trichloramines are 4x heavier than air → consider source capture?
- Art of air distribution
    - ASHRAE dictates recommended air changes per hour (ACH)
        - 4-6 ACH for natatorium
        - 6-8 ACH for spectator area
        - 8 ACH for water parks
    - Specify cfm needed to satisfy ACH required and to get OA required into breathing zone
    - Supply air to where condensation is predictable such as exterior windows, doors, etc.
    - Return air to compliment and avoid short circuiting (can cut off as much as 50-75% of

effective supply air)
    - Perimeter air supply can cause a desireable secondary airflow at 10-30fpm over the water surface
- Art of duct design
    - Duct materials are critical
        - Galvanized grade G90 or higher is ok
        - Aluminum is good but expensive (anodized prefered)
        - Fabric is great but proper air distribution is critical
        - Avoid stainless steel due to high corrosion concerns and high cost
            - Photo shown of corrosion of high grade 316L SS after only 8 months
- Heating and cooling
    - Space temperature is 10-15F higher than typical applications (more heating, less sensible cooling)
    - Including OA is critical as this will acount for approx. 50% of heating load
- Energy/heat recovery
    - Approx. 100F ΔT between OA and EA in winter (high energy savings potential)
    - Recommended for units 2000-5000cfm or higher
    - Pool water heating is a no brainer (free pool heat at the cost of proper dehumidification)
- Mr. Palitza opened the floor to questions from the audience.
- After a brief question and answer period President Steve Moons thanks Mr. Palitza and the meeting was adjourned at 20:50.