TC 08.05 RESEARCH REPORT – JUN 2014 / SEATTLE

The joint TC 1.3/8.5 Research Review Meeting was held on Sun 29-Jun from 3:00pm to ~4:00pm. Status/updates were presented for TC 8.5's 1667-RP and TC 1.3's 1556-RP. Continuing discussion of research topics occurred during the TC 8.5 Committee meeting on Mon 30-Jun.

Active Research Projects

1677-RP – Measurement and Prediction of Waterside Fouling of Internally Enhanced Condenser Tubes in Cooling Tower Applications *PI: Dr Xinlei Wang w/research associate Chao Shen, University of Illinois – Urbana/Champaign. Start date: 01-Sep-2013. Original end date: 31-Dec-2015. PMS: Ben Dingel (chair), Satyam Bendapudi, Andreas Knoepfler, Satheesh Kulankara, Jon Cohen.*

The literature review was reported to be completed. Design of the test shells and supporting facility is also completed. The three test shells will be fabricated by Alfa Laval (Joe Huber as point of contact). The tubes to be tested have been discussed and selected. Tube specimens will be supplied by Wieland (Andreas Knoepfler as point of contact). It was decided to use a set of enhanced tubes (rather than plain tubes) during shake-down testing. These milestones were aided by several teleconference calls and numerous email communications between UIUC and the PMS since the New York meeting.

Facility construction is projected to be finished by 31-Aug. Facility shake-down will occur during Sep with testing to begin 01-Oct. Testing is now projected to run through Sep 2016.

Two questions were raised from experience on 1345-RP. 1) The tubes will be grouped by level of performance. Saturation temperature will be adjusted to give similar levels of heat flux. Still, there will be some variation in tube wall temperatures. Might this impact and confound the fouling rate? 2) Will the clean tube performance be mapped over a range of operating conditions so as to provide an adequate basis for comparison as performance moves due to the effects of fouling?

Prospective Research Projects

The RTAR titled "Heat Transfer Performance of Medium Pressure Alternative Lower GWP Refrigerants in a Flooded Evaporator Comprising an Enhanced Tube Bundle", authored by Justin Kauffman, was approved by email ballot in late Apr and submitted to MORTS on 02-May for consideration by RAC at the Seattle meeting and assigned number 1731. Our research liaison stated that RAC approved the RTAR. Justin indicated that he would target completing the Work Statement by the 15-Dec submission deadline for consideration by RAC at the Chicago meeting. Ken and several others offered to assist with development of the Work Statement.

Our list of potential research topics includes (each looking for an author/champion):

- *Heat transfer performance of lower GWP refrigerants in a sprayed evaporator bundle*
- *Heat transfer performance of lower GWP refrigerants in a condenser tube bundle.*
- *Heat transfer performance of lower GWP refrigerants in plate-type evaporators.*
- *Heat transfer performance of lower GWP refrigerants during in-tube flow boiling.*

- *Evaluation of Tube Cleaning Processes and Techniques.*
- *Impact of Oil on Flooded Coolers.*
  TC 8.2 submitted an RTAR to perform a field survey of oil levels/concentrations in evaporators of scroll, screw, and centrifugal chillers; the RTAR was approved at the New York RAC meeting. A follow-on project would be needed to understand the implications of the survey results on actual chiller performance.

Consensus from the discussion during the TC 8.5 meeting was that a tube bundle condensation project with low GWP refrigerants would be a nice complement to the bundle boiling project (1731-RTAR).

There was also discussion on the topic of how to deal with the question of test facilities (existing versus new) in work statements. There have been comments from RAC that ASHRAE does not fund construction of new test facilities. There were thoughts that if a proposal included new facilities but fit into the estimated budget, then it should be considered.

Notes from Research Breakfast

The slides from the Research Breakfast are attached. ASHRAE currently has 63 active research projects with a total value of $10.8M. Since Jun-2013, 16 projects have been completed, 20 new projects were approved for funding with 19 already under contract, and 12 TRP's released for bid. There is now a more normal balance between proposed research and available funding.

In Seattle, RAC evaluated 9 RTAR's with 5 accepted with comments and 4 rejected with comments. Eight work statements were evaluated with 4 conditionally accepted and 4 returned with comments. One additional WS was to be evaluated on Wed. Two URP's are under review by RAC and TCs.

Beginning with the Seattle meeting, RTAR's will either be "accepted" or "rejected"; RTAR's will no longer be recycled. Accepted RTAR's might (likely) come with comments that will need to be addressed in the work statement. If a TC judges an RTAR was incorrectly rejected, it is possible to resubmit the RTAR (will be given a new number). It is likely that modifications will be needed to address concerns; our liaison can offer advice in these cases.

The proposal evaluation process is changing. When the PES receives that package of bids, the bid values will be withheld. The PES will judge/grade the proposals strictly on the technical criteria laid out in the RFP, without regard to the bid amounts. Once the technical review is completed (PES members do their individual grading, followed by group discussion and grade adjusting) and the PES chair has compiled the results/averages, the bid values will be revealed. The lowest bid that meets the "70" grade threshold will likely be the recipient. It will still be possible to select a higher bid if sufficient justification is found.

ASHRAE has released a new Strategic Plan. Beginning Jul 2015, RAC will form an advisory committee to establish a new Research Strategic Plan. Until that is published, RTARs and WSs should continue to be based on the 2010-2015 Research Strategic Plan.

RAC is discussing possible avenues for co-funding outside projects. There is no process to do this now.

The next deadline for RTARs and WSs is 15-Dec-2014.

Research Subcommittee Chairs' Breakfast Presentation

Annual Meeting 2014 – Seattle
Donald Bivens, Vice Chair
Monday, June 30, 2014

Research Administration Committee

MANY THANKS TO AGAMI REDDY & PIOTR DOMANSKI

Research Administration Committee

MANY THANKS TO YOU AND YOUR COMMITTEES!

'RESEARCH IS THE TECHNICAL UNDERPINNING OF ASHRAE'

"RESEARCH IS THE FUNDAMENTAL FOUNDATION OF ASHRAE"

Edward Tsui, BOD Ex-Officio, January 2014

Research Administration Committee

Agenda

- Current Research Projects
- WS, RTAR, TRP, and URP Status
- Your RAC liaisons
- RAC Continuous Improvement
- ASHRAE Strategic Plan 2014

Balanced position between RTAR/WS "flow & funding.

Current Research Projects

- We have **63** active RPs
- **Total value $ 10.8 million**

Since June 2013:

- **16** projects were completed.
- **20** new projects approved for funding (19 have been contracted)
- **12** Tentative Research Project (TRPs) released for bid (no projects on-hold due to funding)

RTAR, WS, TRP, & URP Status

- At Seattle, RAC evaluated **9** RTARs
  - 5 accepted with comments; 4 rejected with comments
- RAC evaluated **8** WS
  - 4 conditionally accepted; 4 returned with comments (1 other WS to evaluate on Wed)
- 4 TRP bid packages to evaluate on Wed.
- 2 URPS under review by RAC and TCs

Your Research Liaisons

- 1- Arthur Giesler
- 2- Harvey Sachs
- 3- Mark Spatz
- 4- Xudong Yang
- 5- Ricardo Esbri*
- 6- Stephen Hancock
- 7- Phil Haves
- 8- David Yashar
- 9- Jeff Gatlin*
- 10-John Shonder

* new

Use Your Liaison

- Your Liaison should read your RTARs and WSs before you submit them.
  - But give them more than a couple days before the deadline
- Your Liaison can help you interpret RAC comments and the Research Manual
- Your Liaison is your champion!
  - can advocate for you, <u>if involved</u>

When PES receives bid packages, bid values will be withheld. - "Blind" review. Technical ~~value~~ only. PES chair compiles results/averages. Then amounts are announced. WS criteria for judging. Handbook is suggestions only.

RAC CONTINUOUS IMPROVEMENT

- Simplified RTAR form and approval requirements (is the topic suitable for ASHRAE funding?)
- Increase communications with liaisons on RTAR/WS submissions & reasons for returns
- Liaison collaboration with other liaisons or outside 'experts' for best RTAR/WS reviews
- Research Manual Section 6 Instructions for PES (contractor selection) revised/clarified

Accepted or Rejected. No recycling.

VM&CM can attend PES-to-TC contractor selection/recommendation discussions. Bidders, etc. should be excluded. Discussions/result are confidential.

RAC discussing possible avenues for cofunding outside projects. No process now. Maybe 6 mo - 1 yr.

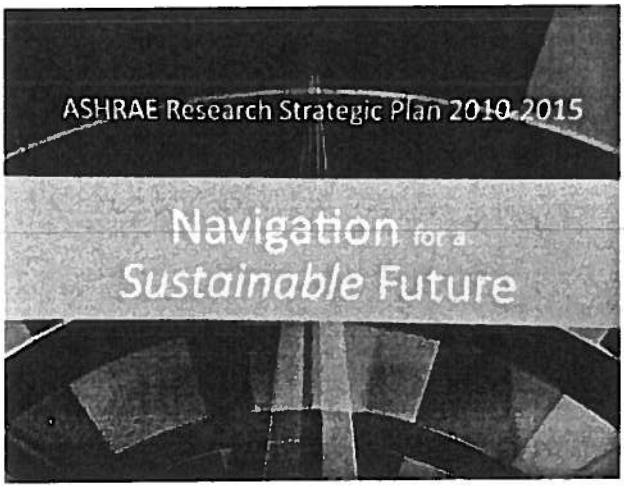
MBO: Management By Objectives.

ASHRAE Strategic Plan 2014

- Initiatives assigned (to establish MBOs and action plans for upcoming year)
- RAC to participate in study of benefits of ASHRAE standards & technology, focused on needs of consulting engineers
- Beginning July 2015, RAC will form an advisory committee to establish new ASHRAE Research Strategic Plan

RTARs: ~~Accept or Reject – no recycling.~~

RTAR & WS submissions continue to be based on 2010-2015 Plan



ASHRAE

ASHRAE RESEARCH VISION: ASHRAE conducts timely research to remain the foremost.....international source of technical and educational information, standards, and guides on the interaction between people and the indoor and outdoor environment through the operation of HVAC&R systems in buildings and other applications.

ASHRAE RESEARCH STRATEGIC PLAN (2010-2015) addresses technical challenges that limit our ability to maximize building performance, energy efficiency, and indoor environmental quality, while minimizing our impact on the environment.

ASHRAE **Research Administration Committee**