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TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO TC 1.3 DATE 17 June 2013

TC/TG/TRG TITLE Heat Transfer and Fluid Flow

DATE OF MEETING 22 January 2013 LOCATION Dallas, TX

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Zahid Ayub	2011	Ebrahim Al-Hajri	2011	Omar Abdelaziz
Steven Brown	2011	Branislav Korenic	2012	Vikrant Aute
Lorenzo Cremaschi	2009	Axel Kriegsmann (NQ)	2009	Rick Couvillion
Steve Eckels	2010	Petur Thors	2010	Jon Hartfield
Anthony Jacobi	2012	Samuel Yana-Motta	2011	Fatemeh Hassanipour
Justin Kauffman	2009			Joe Huber
Michael Ohadi	2012			Pega Hrnjak
Stanislav Perencevic	2012			Amir Jokar
Ken Schultz	2010			Hyunyoung Kim
				Satheesh Kulankara
				Kishan Padakannaya
				Sankar Padhmanabhan
				Gustavo Pottker
				Ankit Sethi
				S.A. Sherif

DISTRIBUTION

<i>All Members of TC/TG/TRG plus the following:</i>	
TAC Section Head: Victor Penar	
TAC Chair: William McQuade	
All Committee Liaisons As Shown On TC/TG/TRG Rosters:	
Manager Of Standards	
Manager Of Research & Technical Services	Mike Vaughn



ASHRAE TC 1.3 – Heat Transfer and Fluid Flow Winter Meeting, 22 January 2013 (Dallas, TX)

Introductions (A. Jokar)

Amir called the meeting to order at 1:01 PM and read the TC 1.3 TPS. Following this, attendees introduced themselves to the committee.

Confirmation of quorum (A. Jokar)

9 of 13/14 (1 Non-quorum absent) voting members were present, so the quorum was established.
Members present: Ayub, Brown, Cremaschi, Eckels, Jacobi, Kauffman, Ohadi, Perencevic, Schultz
Members absent: Al-Hajri, Korenic, Kriegsmann (NQ), Thors, Yana-Motta

Approval of the Minutes from the previous meeting in San Antonio, TX

Steve Eckels moved to approve the minutes as submitted. Ken Schultz seconded the motion. The motion passed by a vote of seven for, none opposed, two abstained (7-0-2).

Liaisons' Comments (A. Jokar)

Victor Penar (Section Head)

- Updated rosters take effect 1 July 2013. The TC should email a copy of the revised roster workbook to Victor and place a hard copy in the section head mailbox by Tuesday evening.
- TC 1.3 is responsible for Fundamentals handbook chapters 2-5 and 39.
- TC 1.3 has one active research project, RP-1556. A few URPs have been submitted to the committee for review at this meeting.

Art Giesler (Research Liaison)

- Next year the society board will update the society strategic plan. Any comments may be submitted to TEC council. Note that this is not the RAC research plan, but the RAC research plan will be revised to be consistent with the new society strategic plan, beginning next year.
- RAC is working to improve the research plan submission process. A simplified RTAR form first draft is complete and simplifies the focus to the topic, the knowledge that will be generated, the value the research will provide, and the research budget. The goal is to make it easier for research to be submitted as an RTAR.
- The word "guideline" may not be used in the title of a publication. This word is reserved for use in ASHRAE standards.

Report from Membership Sub-Committee Chair (J. Hartfield)

The list of current voting members is shown below, totaling fourteen members with six from academia and eight from industry.

Al-Hajri, Ayub, Brown, Cremaschi, Eckels, Jacobi, Kauffman, Korenic, Kriegsmann (NQ), Ohadi, Perencevic, Schultz, Thors, Yana-Motta

The committee has fifty-three corresponding members, and Jon will circulate a survey to ensure continued interest of corresponding members.

The new society year begins 1 July 2013. At that time, the following changes will occur:

Rolling off:

- Yana-Motta rolling off as chair and voting member
- Cremaschi, Kauffman, Kriegsmann, rolling of as voting members

Rolling on:

- Jokar rolling on as chair and voting member
- Couvillion, Huber and Kulankara rolling on as voting members
- Kauffman rolling on as vice chair (non-voting)
- The committee is looking for a volunteer to take on secretary position

Jon added that anyone interested in becoming a corresponding member should see him after the meeting and provide a business card and ASHRAE member number.

Report from Program Sub-Committee Chair (L. Cremaschi)

TC 1.3 submitted two seminars for presentation in Dallas. The first, seminar 68 “Lubricant Effects on Heat Transfer and Pressure Drops in Heat Exchangers” will be presented Wednesday. Steve Eckels will chair the seminar and only Lorenzo Cremaschi will present. The two other presenters are unable to present due to an emergency absence and a lack of authorization to present confidential material, respectively.

The second seminar was not formally accepted, but was authorized for presentation during the TC 1.3/8.5 research review meeting on Sunday. The presentation titled “Fundamental Thermal Properties of New Lower GWP Refrigerants for Heat Transfer Analysis” was chaired by Ken Schultz and featured presentations by Eugene van Rooyen, Mark McLinden, Ankit Sethi, and Mark A. Kedzierski. The presentation was very well attended (estimates are 125-150 attendees) and was well received. Ken expressed that the informal submittal process was smooth, but he discouraged use of this approach regularly to ensure that the committee is not bypassing the official process.

For future programs in Denver and beyond, Cremaschi solicited recommendations from the committee. Getting no response, Eckels added that ASHRAE is not short on program submissions, so the committee should not feel obligated to submit for each conference. Seeing no program suggestions at the meeting, Lorenzo will solicit program ideas via e-mail between this and the Denver meeting. He added that for program submission, each seminar presentation requires an abstract and a minimum of five questions and five answers that the presentation will address.

A question was brought up regarding presentation of research in a seminar and then using related information in a HVAC&R paper. Dr. Garimella of RAC expressed his opinion that this is not an issue because the seminar is not a written paper format.

The submission deadline for forums and seminars in Denver is 11 February 2013. Program uploads will begin 6 May 2013 and the deadline is 3 June 2013.

The submission deadline for conference paper abstracts for New York is 15 March 2013. Full technical papers are due 19 April 2013, and final conference papers (for accepted abstracts) are due 2 July 2013.

The tracks for the New York conference are listed below:

Track 1 HVAC&R Systems and Equipment

Track 2 HVAC&R Fundamentals and Applications

Track 3 Environmental Health through Indoor Environmental Quality

Track 4 Building Information Systems: Integrating Technology for Control, Management, Optimization and Efficiency

Track 5 International Design

Track 6 Building Performance and Commissioning for Operation and Management

Track 7 Hydronic System Design for Efficiency and Large Buildings

Track 8 Tall Buildings: Performance Meets Policy

Amir suggested that program chairs and speakers specify time slot conflicts when submitting programs.

Report from Handbook Sub-Committee Chair (R. Couvillion)

The TC recently submitted revisions that are in preparation for print. The two-phase flow chapter saw significant updates while the other chapters received only minor revisions. The properties chapter (39) may need addressed in the next revision cycle to update tabulated data or to consider an alternative approach and refer readers to other resources.

Rick is awaiting review comments from the College of Fellows, which are expected later this year. Therefore the handbook subcommittee will reconvene this fall to begin preparations for the next revision cycle. There will be no formal meeting in Denver.

Report from Webmaster (E. Al-Hajri)

Amir presented in Ebrahim's absence. By a show of hands, the website is not used frequently, but it was noted that the site is not completely up-to-date. The most important items on the website are the list of current members (without contact information to prevent spam), meeting minutes and meeting agendas. Additionally, the speakers from the Sunday program agreed to have their presentations posted to the website. Amir added that it would be good to have a list of TC 1.3 ASHRAE sponsored publications listed under the research section of the site.

Report from Research Sub-Committee Chair (J. Huber)

Research Chair Breakfast

The Service to ASHRAE research award was granted to Herman Behls. Herman joined ASHRAE in 1965 and has been involved with number of research projects, including RP-2.

There are sixty-two current active projects, with approximate budget of \$12M. Since last meeting, eight projects have been completed, ten have started, and six have been released for bid. There are concerns that the research 'pipeline' is running low, with only three RTARs and four work statements evaluated in Dallas. Seven projects are expected to go out for bid in Spring 2013 and there are no projects beyond those.

ASHRAE recognizes that they are running out of research. To address this, RAC is trying to improve the research submittal process, simplifying the requirements for RTAR submission, with many details being reserved until the work statement step. It was added that if a committee has a very strong project, the RTAR step may be skipped and a work statement may be submitted directly.

While RTARs and work statement submittals were down, nine unsolicited research proposals (URPs) were reviewed at this meeting. Six were rejected and three are under review. RAC believes that the URP path is being abused, and should only be used in unique situations.

Sixty-three applied for grants-in-aid and twenty-one were approved. These are \$10k awards for students participating in ASHRAE research. Ricardo de Silva Lima was granted the Homer Adams award. There were seven nominations for the new investigator award and it was granted to Panagiota Karava.

The Innovative Research Grant program, focused on out-of-the box and extremely innovative work, has received eighteen pre-proposals. RAC will be reviewing the proposals Wednesday. A detailed description of the program can be found on the [ASHRAE website](#).

Finally, research money is piling up, so ASHRAE actively looking for RTARs and WSs.

Current Research

RP-1556, “Characterization of Liquid Refrigerant Flow Emerging From a Flooded Evaporator Tube Bundle”, is being investigated by KSU, with Jon Hartfield leading the PMS. Other PMS members include Zahid, Satheesh and Satyam. Steve Eckels presented his first review at the TC 1.3/8.5 research review on Sunday. The project is just getting started, so he discussed the goals and scope of the project, namely to study the size, distribution and trajectory of droplets coming off the top of a flooded tube bundle. He described the state of the equipment, which includes a rectangular shell with visual access for lighting and visualization, a twenty tube (3/4”) enhanced tube bundle with tubes selected by the PMS, and a sophisticated PIV measurement system. He described the shell and bundle geometry and orientation for testing, which will include one tube diameter, but two pitch arrangements and two fluids. The PIV system should improve imaging and analysis of droplets and particle tracking when compared to the more primitive imaging system used to gain experience on a smooth tube bundle. Testing is expected to begin before Denver.

Long-Range Research Ideas

An RTAR titled regarding experimental evaluation of two-phase flow patterns with ammonia was returned with a number of comments from RAC. A thesis is available demonstrating test measurements of pressure drop in two-phase U-bends with ammonia. Sankar is reviewing the thesis and early indications are that the thesis data is insufficient to provide what is expected from the RTAR. Another concern was the budget of the project, but Sankar is working with Bruce Nelson to review budget. RAC also believes that IIAR should be involved, so Bruce Nelson is pursuing co-funding options (he is research chair for IIAR). The final comment expressed concern that the project should seek to find existing laboratories capable of working with ammonia to reduce facility development expenses. Sankar intends to take the comments into account and revise RTAR and present it to the research liaison and the committee.

RAC member comments (Garimella):

There is no reluctance from ASHRAE to fund projects with large budgets. But when evaluating RTARs certain metrics are maintained. Quite often there is no comment of research review, experiments, CFD, literature review, etc. in RTARs. An improved RTAR submittal form is intended to clarify this. It is recommended that RTARs justify their budget with detailed estimates of hours, etc.

Unsolicited Research Proposals

Dr. Shah submitted three URPs to RAC. All three were rejected by RAC. Mike Vaughn suggested that they be directed to TC for rework into Work Statements if the TC found the content viable. Two were submitted to TC 1.3 for review. Dr. Shah suggested that Zahid would present the third during the meeting. The URPs were distributed to the TC for consideration and were reviewed during the research review meeting. RACs concerns were due to the research emphasis on plain tubes, the idea that re-correlating existing data did not fill gaps, and questions about the applicability to new refrigerants. In light of flow boiling and void fraction methods being research, questions were raised about the applicability of the correlations. The general consensus at the meeting was that the URPs are not in line with the TC research direction. The TC expressed no interest in converting the URPs into WSs.

New Ideas

Satheesh is working on working on an RTAR regarding pressure drop and two-phase flow across orifices with support from Steve Eckels and Samuel Yana-Motta.

No progress has been made on the modified surface energy topic.

Amir and Zahid are working on an RTAR regarding wetting and draining of water from evaporative condensers. Amir is planning to finalize the RTAR and send it to the committee for review and then submit for May deadline. The research focuses on use of hydrophilic surfaces to extract water from the air to improve evaporative performance. The topic was discussed with TC 8.6 and the members expressed interest. TCs 5.7 and 8.4 may also have interest. Amir requested help in defining the test matrix, geometry, surface conditions, etc. It was discussed that the text matrix is unnecessary for RTAR, so the work is 90% complete for submittal.

Lorenzo noted difficulty in defining heat transfer coefficients with frosting/wetting on surfaces. This topic was also discussed in TC 8.4.

Omar expressed MTG support in TCs taking on summary of AHRI AREP test results and suggested that it may be a good topic for a seminar for NY.

Interest in TC 8.5 project on shellside-boiling of lower GWP refrigerants ?

Jon Hartfield presented an idea studying freezing inside a channel or a tube. The research would be targeted toward improving understanding influences on freezing in enhanced tubes and brazed plate channels with and without flow. The research could also examine the effects of water/glycol mixtures.

Announcements from TC Chairs' Breakfast Meeting (A. Jokar)

CEC representative gave summary for Dallas: 43 technical papers submitted, 28 accepted, 9 scheduled. 107 Conference papers submitted, 40 accepted, 14 scheduled. 131 seminars submitted, 71 accepted, 71 scheduled. 22 forums submitted, 9 accepted and 9 scheduled. Garimella expressed frustration with ASHRAE due to conference paper rejection due to dual units, etc. Feedback that perhaps the requirements for conference papers should be relaxed during editorial review. Dual units seems excessive for review.

The forum held during the research meeting was observed by ASHRAE and attended by approximately 150 people. The high turnout will hopefully improve odds for program acceptance in the future.

ASHRAE is looking into E&V conference meetings to have happen in 2015. May allow additional improved attendance. But it could provide anti-incentive for travel to ASHRAE meetings.

New Business (A. Jokar)

No new business.

Adjourn.

Kauffman motioned to adjourn the meeting. Eckels seconded the motion. Unanimous vote. The meeting was adjourned at 3:03 PM.