

ASHRAE TC 6.9 – Thermal Storage
General Meeting Minutes
Monday, June 27th, 2022
4:30 – 6:00 PM EST
Hybrid – Toronto Sheraton Centre, Carleton and MS Teams Meeting

Attendees

Attendees included:

Alexander Zhivov	G	
John Nix	VM	
Charles Booten	VM	
Richard Brooks	VM	Program Subcommittee Chair
Farzin M. Rad	VM	Chair
Daniel Pyewell	VM	Vice Chair/ Webmaster
Ken Fulk	VM	
Guy Frankenfield	VM	
Blake Ellis	CM	Standards Subcommittee Chair
Amy Van Asselt	VM	
Navin Kumar	CM	Handbook Subcommittee Chair
Kyle Gluesenkamp	CM	
Bruce Lindsay	CM	
Jason Woods	CM	
Sandra Boetcher	CM	
Mark MacCracken	VM	
Tim Andereson	G	
Paulo Cesar Tabares	CM	Research Subcommittee Chair
Kyle Glusenkamp	CM	
Mustafa Morsy	PCM	
Tim Hunt	CM	
Him Ly	G	
Ivan Thomas	CM	
Som Shrestha	CM	
Geoff Bares	CM	
Vincent Chalot	G	
John Dunlap	VM	
Emishaw Iffa	CM	Secretary

Preliminaries

- i. Meeting called to order at 4:34PM by Chairperson, Farzin Rad.
- ii. Housekeeping – Zoom link was not working. Farzin sent out a Teams meeting invitation.
- iii. The TC 6.9 Purpose Statement and Code of Ethics Commitment was read by Farzin Rad.

- iv. Voting Member Roll Call – Ten voting members were present: Farzin Rad, Richard Brooks, Guy Frankenfield, John Dunlap, Amy Van Asselt, Daniel Pyewell, John Nix, Ken Fulk, Mark MacCracken, and Charles Booten. The following voting members were not present: Henry Becker and Scott Shaffer.
- v. Based on 10 of the 12 voting members present, a quorum was determined.
- vi. All attendants were given the opportunity to introduce themselves.

Approval of Minutes

- vii. Las Vegas winter Hybrid T.C. 6.9 meeting minutes: John Nix made a motion to approve the minutes, seconded by Mark MacCracken. The present 10 voting members approved; thus, the minutes were approved unanimously.

Liaison Reports

- John Nix mentioned his plan to reach out to Building Decarbonization and Global Climate Change TCs.
- John Dunlap had no update on Standard 90.1.
- Guy Frankenfield mentioned if there is an update on a planned RTAR with T.C. 4.1 in 2019. Som Shrestha offers to check if there is any progress from the T.C. 4.1 side.

Standards – Blake Ellis

- ANSI/ASHRAE Standard 150-2000 (RA 2019) – Method of Testing the Performance of Cool Storage Systems
 - a. Background:
 - i. New SPC was formed. (Chuck Dorgan Chair, Blake Ellis, Vice Chair, Geoff Bares Secretary)
 - ii. First meeting was in Las Vegas.
 - iii. Met monthly virtually.
 - iv. Met on Saturday in Toronto.
 - b. Activities:
 - i. Voted to recommend a change to the Title Purpose and Scope.
 - ii. Looking to add two methods of test. A sensible test and a latent test.
- SPC 233P – Testing, Evaluating, and Reporting of Phase Change Materials Performance
 - c. Previous Timeline
 - i. Approved by the TC in August 2021
 - ii. Sent to PPIS in August 2021
 - iii. Proposed Standard authorized November 2021.
 - iv. Get an update in the subcommittee meeting.
 - d. Contact:
 - i. Navin Kumar, Chair
 - ii. nkumar@gti.energy
- Other Standards (of Interest to T.C. 6.9):
 - e. ANSI/AHRI 900 (I-P)-2014 & ANSI/AHRI 901 (SI)-2014, Performance Rating of Thermal Storage Equipment Used for Cooling – ANSI Approved in 2015; reaffirmed in 2020.
 - i. Status: No Change since it was reaffirmed in 2020 with no changes.
 - ii. Contact:
 - Sarp Hamamcioglu

507 E. Craighill Channel Dr.
Perryville, MD 21903
667-228-9626
shamamcioglu@ahrinet.org

- f. Proposed ASME (American Society of Mechanical Engineers) TES-2-200X, Safety Standard for Thermal Energy Storage (TES) System Requirements for Solid State and Other TES Systems is being monitored.
 - i. Tentative Scope: Safety requirements for high temperature TES systems
 - ii. Status: In development
 - iii. Contact:
 - Nicole Gomez
 - S&C Project Engineer, Safety Codes & Standards
 - ASME
 - 2 Park Avenue, 6th Floor
 - New York, NY 10016-5990
 - Tel 1.212.591.8720
 - Fax 1.212.591.8501
 - gomezn@asme.org

Programs – Richard Brooks

- Current Programs – June 25, 2022 – June 29th, 2022, Toronto, ON Sheraton Centre.
 - a. T.C. 6.9 has sponsored one Seminar that will be presented at this meeting.
 - i. Seminar 30 – The Solar Panel: Enabling Renewable's Integration with Thermal Energy Storage Systems
 - Tuesday, 06/28/2022 8:00 a.m. – 9:30 a.m. EDT,
 - Chair: Jason Woods
 - Technical Committee: 6.9 Thermal Storage
 - Location: Sheraton Centre Toronto, Grand East (LC)
 - Program Track: Connected Buildings, Connected Communities
 - b. T.C. 6.9 has co-sponsored two seminars that will be presented at this meeting.
 - i. Seminar 51– Thermal energy Storage Solutions for Buildings: Materials to applications
 - Wednesday, 06/28/2022 11:00 a.m. – 12:30 a.m. EDT,
 - Chair: Kashif Nawaz
 - Technical Committee: 1.3 Heat Transfer and Fluid Flow
 - Co-Sponsoring Committee: 6.9 Thermal Storage
 - Location: Sheraton Centre Toronto, Sheraton C (LC)
 - Program Track: HVAC & R systems and Equipment
 - ii. Seminar 40: Chiller-Heater Systems Enabled by Compressors and Ice
 - Chair: Haotian Liu, Ph.D.
 - Technical Committee: 8.1 Positive Displacement Compressors
 - Co-Sponsoring Committee: 6.9 Thermal Storage
 - Other Sponsoring Committee: 8.2 Centrifugal Machines
 - Location: Sheraton Centre Toronto, Dominion North (2)
 - Program Track: HVAC&R Systems and Equipment.

- Future Programs- 2023 ASHRAE Winter Conference February 4-8, 2023. Atlanta, GA. The four programs pushed forward to the CEC Selection Committee are as follows:
 - i. **TES -101**
 - a. The History of TES (Past, Present, & Future)
 - b. Chair = Bruce Lindsay (Calmac/Trane)
 - c. Presenters are as follows:
 - i. Bruce Lindsay
 - ii. TBD
 - iii. Mark MacCracken
 - ii. **Heating Season Thermal Energy Storage**
 - a. Present on the Best Practices for Season Storage for Heating Applications
 - b. Chair= Farzin Masoumi (Enbridge Gas Inc.)
 - c. Presenters are as follows:
 - iv. Farzin Masoumi
 - v. TBD
 - vi. Amy Van Asselt (maybe putting a Domestic HW spin on the presentation)
 - iii. **Thermal Energy Storage in High Profile Projects (Steam to HW Conversion)**
 - a. Discuss projects like Princeton and/or Stanford where Steam has been converted to HW + TES
 - b. Chair = Blake Ellis
 - c. Presenters are as follows:
 - i. Blake Ellis
 - ii. TBD
 - iii. TBD
 - iv. **Smart Controls and Optimization for Effective Integration of HVAC with Grid Thermal Energy Storage.**
 - a. Chair = Paulo Tabares
 - b. The presenters will be as follows:
 - i. Amy Van Asselt - Smart controls for Cooling and RENE
 - ii. Jason Wood of NREL- Integration of TES and HVAC for Optimal Performance
 - iii. Karl Heine - Community Scale Optimization of TES
- Finally, TC-6.9 agreed to co-sponsor the following proposed seminar:

Integrating TES with HVAC Systems (Optimizing)

The sponsoring group is TC-1.13 & TC-7.5 (Smart Building Systems)

Chair = Kyle Gluesenkampk (ORNL)

Presenters are as follows:

 - i. Jane O'Neil
 - ii. TBD-Student Presenter
 - iii. ORNL on Optimization of Controls

Handbook – Navin Kumar

- No update at this time.
- Handbook review schedule is in the 2nd year. The planned draft submission date is August 8, 2023
- Farzin asked members to contact Navin if they would like to add additional literature to the handbook.

Research –Paulo Cesar Tabares Velasco

Paulo Tabares presented the RTAR progress and potential new research topics.

1. RTAR:

- Hot water storage. Why are people not doing more often? Why not spread usage? Still need to define scope.
 - Joe Rendall, Amy Van Asselt (looking for collaborators)
 - Armada Power (OH), 3rd party aggregator
- Phase-change Material Thermal Energy Storage for Light Commercial and Residential HVAC Applications: no progress
 - Sandra Boetcher, Spencer Dutton, Kyle Gluesenkamp, & Paulo Tabares
 - Sandra: Optimizing and utilizing advanced manufacturing topics suggested to be added
- Quantify broad Benefits of TES
 - MarK, Contact Kyle (ORNL) and Chuck (NREL).
 - Mark mentioned increasing the capabilities of Energy plus to incorporate add thermal storage.
- Identifying synergies between behind-the-meter battery and thermal energy storage
 - Jason Woods and Paulo Tabares

2. Potential New Ideas:

- i. Seasonal energy storage
- ii. Unearthing and quantifying the benefits of TES beyond \$\$\$
- iii. Comments from DOE TES workshop???
- iv. TES and EV
- v. Potential cost savings maps for cool storage (Paulo Tabares, Mikael Salonvaara)
- vi. Potential for value TES for vegetable/fruits preservation.
- vii. Renewable energy generation + energy storage (heating purposes)

3. Additional Ideas:

- i. Optimal Design and Control of Distributed Cool Thermal Energy Storage for the Interactive Grid (Amy Van Asselt and Karl Heine)
- ii. Convective heat transfer role in PCMs effectiveness
- iii. TES control to maximize mix of renewable energy generation
- iv. Control strategies with a stochastic (not deterministic) data
- v. Renewable energy generation for heating purposes or for mix storage sources
- vi. PCM Plenum Storage
- vii. Methods to Address High Flow Requirements When Using TES for Emergency Cooling
- viii. Secondary Coolants, Refrigerants Efficiency Improvements to TES
- ix. Small plate diffusers. Characterization. Design vs figure of merit. Varies way to design diffusers.

Long Range Planning/Website – Farzin Rad

- Guy Frankenfield continues to sit in on meetings for ESIC (Der-vet software), to ensure eventual integration of thermal storage into the software (essentially same note as prior meeting)
- Guy Frankenfield mentioned the Climate Bill that is moving forward in legislation, and his continued involvement to establish a coalition to influence lobbyist to change wording to include other types of energy storage technologies beyond electrical storage.
- Geoff Bares mentioned the strategic plan that was indicated in the Chair's breakfast that needs to be established for each T.C., in line with the newly revised M.O.P.'s strategic plan.

Honors and Awards – Blake Ellis

TC 6.9 Members Receiving Awards at this Meeting:

Crosby Field Award

Charles S. Barnaby, Fellow Life Member ASHRAE and **Peter Simmonds (CM)**, Ph.D., Fellow Life Member ASHRAE, are recipients of the Crosby Field Award for "Development of a Unified Tool for Analysis of Room Loads and Conditions," which was judged to be the best paper presented before the Society. The Crosby Field Award is named for a former Presidential Member.

Distinguished Service Award

The Distinguished Service Award salutes members of any grade who have served the Society faithfully and with distinction and who have given freely of their time and talent in chapter, regional and Society activities. The following TC 6.9 members were recognized:

- **John S. Andrepont (CM)**, Life Member ASHRAE, President, The Cool Solutions Company, Lisle, Illinois.
- **Trenton S. Hunt (VM)**, Vice President, Mechanical Products NSW, Salt Lake City, Utah.

Fellow ASHRAE

Fellow ASHRAE is a membership grade that recognizes members who have attained distinction and made substantial contributions in HVAC&R and the built environment such as education, research, engineering design and consultation, publications, presentations and mentoring. The Society elevated the following TC 6.9 member to the grade of Fellow:

- Blake E. Ellis, P.E. **(CM)**

John F. James International Award

Peter Simmonds, Ph.D (CM)., received the John F. James International Award. The award recognizes a member who has done the most to enhance the Society's international presence. Simmonds works for Building and Systems Analytics, Los Angeles, CA and Hong Kong, China.

Distinguished Service Award

The Distinguished Service Award salutes members of any grade who have served the Society faithfully and with distinction and who have given freely of their time and talent in chapter, regional and Society activities. The following TC 6.9 members were recognized:

- John S. Andrepont, Life Member ASHRAE, **(CM)**
- Trenton S. Hunt **(VM)**

Crosby Field Award

Peter Simmonds, Ph.D., Fellow Life Member ASHRAE **(CM)**, is a recipient of the Crosby Field Award for "Development of a Unified Tool for Analysis of Room Loads and Conditions," which was judged to be the best paper presented before the Society. The Crosby Field Award is named for a former Presidential Member.

Update ASHRAE Bio

- An updated ASHRAE bio is important as it is reviewed with any award submission and Blake encouraged people to keep their bios updated.

Hightower Award

- Given to people about service the last four years on technical activities.
- TC chair and members of TAC & Tech Council are not eligible.
- TC chair submits the form to the TC section head by September 1.

Other Awards Application Dates

December 1 Due Dates

- *ASHRAE Hall of Fame:* This award honors deceased members who have made milestone contributions to the growth of ASHRAE-related technology. Individuals inducted into the Hall of Fame must have been an ASHRAE member (any grade) or a member of a predecessor Society and must have shown evidence of distinction in the Society, either technically or academically.
- *ASHRAE Pioneers of the Industry Award:* This award honors deceased individuals who have made milestone contributions to the growth of air conditioning, heating, refrigeration and ventilation. Individuals inducted into the Pioneers of the Industry must have shown evidence of distinction, either technically or academically.
- *F. Paul Anderson Award:* This award, named in honor of F. Paul Anderson, 1927-28 President of the American Society of Heating and Ventilating Engineers, is the Society's highest award. This award honors members for notable achievement, outstanding work or service in any field of the Society. Accomplishments should include exceptional leadership in the HVAC&R industry, ASHRAE, and society. Broad-based activities of outstanding value in consulting, contracting, engineering, design, and related activity within ASHRAE are desired. Previous recipients of this award include Willis Carrier, Sam Lewis, Carl Ashley and Donald Kroecker.
- *Fellow Nominations:* ASHRAE members who have attained distinction in the fields of heating, refrigeration, air conditioning, ventilation or the allied arts and sciences through invention, research, teaching, design, original work, or as an engineering executive on projects of unusual or important scope. The individual must have made substantial contributions and have been a full grade member in good standing for at least ten years prior to the date of their election.
- *ASHRAE Award for Distinguished Public Service:* This award recognizes ASHRAE members who have performed outstanding public service in their community, and in doing so, have helped to improve the public image of the engineer.
- *Honorary Member:* Honorary Member status is granted to individuals in recognition of preeminent professional distinction without regard to whether the individual is or has been a member of the Society. Previous recipients include Milton Eisenhower and President Herbert Hoover.

May 1 Due Dates:

- *Louise and Bill Holladay Distinguished Fellow Award:* This award honors Fellows of the Society for continuing preeminence in engineering or research work.
- *Andrew T. Boggs Service Award:* This award, named after Andrew T. Boggs, former ASHRAE Executive Vice President, recognizes past recipients of the Exceptional Service Award for continuing, unselfish, dedicated and distinguished service to the Society.
- *Distinguished Fifty-Year Member Award:* This award recognizes individuals who have been ASHRAE members for a minimum of fifty years, and were a past Society President, a Fellow, recipient of the Distinguished Service Award, or otherwise performed outstanding service for the Society.
- *Exceptional Service Award:* This award recognizes members who have served the Society faithfully and with exemplary effort, far in excess (45 service points) of that required for the Distinguished Service Award (15 service points). The individual must have been a full grade Member for a minimum of ten years and be a past recipient of the Distinguished Service Award.

- *Distinguished Service Award:* This award recognizes members of ASHRAE who have served the Society faithfully and with distinction on committees or otherwise given freely of their time and talent on behalf of the Society (15 service points are required).

Old Business

- None

New Business

- Mark McCracken, Richard Brooks and Kenneth Fulk will be rolling off as voting members.
- Bruce Lindsay and Mike Filler show interest in becoming VMs.
- Emishaw Iffa started serving as secretary of T.C. 6.9.
- Bruce Lindsay (Calmac/Trane) has taken over the Programs Chair position from Richard Brooks.
- Paulo Tabares spoke about on how to market/promote the responsibilities of T.C. 6.9 to potential stakeholders.

Adjourn

Farzin adjourned the meeting at 5:55 p.m.