

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
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TC/TG/MTG/TRG MINUTES COVER SHEET

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

TC/TG/MTG/TRG No. TC 6.5 DATE Jan 18, 2021

TC/TG/MTG/TRG TITLE Radiant Heating and Cooling

DATE OF MEETING Jan 18, 2021 LOCATION Remote

MEMBERS PRESENT	MEMBERS PRESENT	MEMBERS PRESENT	MEMBERS ABSENT
Brett Austin			Jaap Hogeling (non-quorum)
David Springer			Ryan Westlund
Ongun Kazanci			Noah Zallen
Fred Bauman			Richard Bowman
Robert Bean			Aaron Stotko
			Michael O' Rourke

DISTRIBUTION

<i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head	Dawen Lu
TAC Chair	Jay Kohler
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters:	Steven Hammerling
Standard Liaison Manager Of Research & Technical Services	Craig Wray Mike Vaughn
Research Liaison	Stefan Elbel
Handbook Liaison	G. D. Mathur

MEETING MINUTES

TC 6.5 - Radiant Heating & Cooling

Remote

Jan 18, 2028

2 pm – 4:30 pm EST

Call to Order: 14:00

Agenda:

1. **Introduction of members and guests.**
2. **Roll call for quorum**
 - a. Voting members: 5 of 10, 0 of 1 non-quorum. Quorum does not exist.
3. **Reading of previous meeting minutes and vote for approval**
 - a. Ongun asked attendees to review minutes. He will send the minutes for approval by email vote ballot. Results of email vote ballot 8/0/2, previous meeting minutes approved.
4. **Agenda Amendments**
 - a. Handbook liaison G D Mathur: Noted deadline for submission approval for chapters (April 5th, and April 19th 2022).
 - b. Ongun Kazanci – requested any agenda amendments from attendees. Ongun added one agenda item: Vote to approve that TC 6.5 will continue as a TC in 21-22 Society Year, email vote ballot due to lack of quorum. Results of email vote ballot 8/0/2, TC reaffirms and approves that we will continue as a TC.
5. **Information from Section 6 Chair meeting**
 - a. Ongun discussed feedback from the chair's meeting. Discussed the technical program for the online 2021 Winter meeting. Annual meeting is still planned to be face-to-face in Phoenix, between Jun 26 and 30 2021. TAC has approved some TC mergers, many more being considered. Annual re-affirmation process is being enforced. ASHRAE is encouraging interim meetings to ensure there is a flow of work continuing. RAC has reduced available funding due to meeting/show cancellations and generally reduced fundraising. No new projects will be awarded in 2021. RAC is still accepting RTARs and Ws, will be prioritized based on quality, impact and available funding.

"TC Chair - Vice Chair Breakfast" presentation and "Announcements and Reminders for TC/TG/TRG & MTG Chairs" document are available in Basecamp under [ASHRAE TC 6.5> Docs & Files > 2021 Winter Meeting, Online](#)

6. Subcommittee Reports

- a. Program (Ongun – Noah unavailable):
- b. Devin Abellon (previous Programs Subcom Chair) and Peter Simmonds volunteered to take over temporarily for the February submission deadline for Phoenix conference.
 - i. Online (winter 2021)
 1. Devin Abellon – TC 6.5 has one on-demand seminar currently in the meeting: [Seminar 36: A Revolution in Buildings: Prefabricated Radiant Structures](#).
 - ii. Phoenix (summer 2021)
 1. Deadline for program submissions: Feb 8th, 2021.
 2. Ongun suggested seminar ideas:
 - a. On debunking myths and facts of radiant systems.
 - b. Related to controls
 - c. Pros and cons of radiant systems
 3. Don Larson – proposed seminar on infrared radiant
 4. Aura Lee McPherson – proposed seminar on load shifting capabilities of radiant in the context of power outages and resilience. Ongun – could tie in with [IEA Annex 80](#) (Resilient cooling).
 - a. **Action item** – Ongun to approach 2.1 and 2.10 committees to team up on seminar re: resiliency.
 5. Jonathan Woolley – discussed a presentation idea on the design and sizing of embedded surface systems. Also noted that Don Larson’s idea of a PTAR on infrared radiant could be a good topic to combine in a seminar on the design of embedded/hydronic radiant systems (highlighting the different types of radiant systems and mechanisms).
 6. Robert Bean – seminar presentation idea on industrial facilities. Could also do a case study on residential retrofit.
 7. Aura Lee MacPherson – seminar presentation idea on residential retrofit.
 8. Katherine D’Avignon – seminar presentation idea on infrastructure and embedded systems.
 9. David Springer – seminar presentation idea to share data on retrofitting buildings with gas-fired furnaces with radiant and heat pump systems.
 10. **Action item:** Anyone with title and brief description of seminar idea to share with Devin, Peter and Ongun by email by Jan 25.
 - iii. Las Vegas (winter 2022)

1. Technical paper and conference paper submissions are still open.
 2. **Action item:** Devin Abellon to find out deadline dates and forward to group on Basecamp.
- c. Research (Fred Bauman)
- i. PTAR – Radiant Design Guide (Fred Bauman)
 1. Fred Bauman discussed rationale behind and need for an integrated radiant design guide. Submitted PTAR to RAC in March. Actual process of PTAR approval still to be determined and finalized by ASHRAE. No news related to PTAR to date. Assuming it is approved, the next step will be to develop a work statement (primarily a list of contents). Fred requested any additional interested volunteers to contact him.
 2. **Action item:** Fred to follow up with Donna/RAC for update regarding PTAR about next steps.
 - ii. RTAR- Solar Load (Ongun Kazanci)
 1. Ongun Kazanci discussed current status of RTAR regarding direct solar on chilled radiant floor performance. Had a draft towards end of 2019, discussed in Orlando, no progress since then.
 2. Peter Simmonds to take over as lead on this RTAR. Robert Bean discussed extracting solar flux from CBE comfort tool and extending that to add a radiant load calc. Peter Simmonds discussed leveraging the tool sponsored by this committee to extract cooling load under direct solar.
 3. **Action item:** Ongun Kazanci to share most recent version of RTAR and feedback to date with Peter Simmonds.
 - iii. Any research updates:
 1. Lance McNevin – Noted that TC 6.8 has 1890-WS to study flushing to remove debris and air in ground heat exchangers. Would like support from TC 6.5, but we are not an official co-sponsor.
 - a. **Action item:** Fred Bauman to follow up with TC 6.8 to get more information.
 2. Carlos Duarte, recently graduated, shared [his thesis](#) and mentioned journal article being submitted on field study demonstrations of radiant controls, previously presented in ASHRAE seminar in Atlanta. Also discussed simulation study looking at identifying the warmest supply water temperatures that can still meet comfort requirements for a wide range of scenarios and designs. Jonathan Woolley recently graduated, shared [his thesis](#) and is working on an energy simulation paper to show impact of plant sizing and load shifting strategies on design, potential seminar topic submission. Stefano Schiavon mentioned that CBE is upgrading their test chamber and will be able to study radiant systems in the chamber once the work is complete.

3. Ongun Kazanci has a lab study paper under review related to testing radiant ceiling panels that incorporate phase change materials, demonstrating that they can operate similar to TABS. There is also a validated simulation model in TRNSYS. Ongun highlighted [a recent study](#) that DTU has completed looking at different types of wired and wireless sensors for monitoring indoor environmental conditions. Noted that the HybridGEOTABS project is wrapping up and will have a REHVA guidebook as an output. Jun Shinoda (who presented his work on surface heat transfer coefficients in Kansas City) is finalizing his PhD. He is working on another paper, currently under review, which is quantifying the effects of temperature difference between plenum and room temperatures on the cooling capacity and heat removal of radiant ceiling panels. DTU has a new PhD student that will focus on resiliency of building cooling systems and who will also work on radiant systems.
4. Aura Lee MacPherson – mentioned a case study regarding cost-effective passive house design, investigating installing PEX pipe around window perimeter on interior of the building. Investigating temperatures and heat losses compared with windows that do not have this treatment.
5. Robert Bean shared [link to graphic](#) highlighting link between design temperature for heating and cooling systems and energy performance.
6. David Springer shared [recent ETCC report](#) on retrofitting existing residential house with radiant systems and measuring performance.
7. Katherine D'Avignon has been working on schools in Quebec, Canada and is studying these existing buildings. Evaluating overheating effects with radiant systems, and view factors related to comfort for children. TC 2.1 has an RTAR proposed on the topic, authored by Katherine. Also looking at displacement system performance with radiant heating.

iv. Other research topics

1. Fred requested anyone with additional ideas for research topics to reach out to him directly.
2. Potential PTAR – Infrared radiant (Don Larson)
 - a. Discussed putting together a PTAR on infrared radiant. Paul Raftery noted that it may be better to focus on a conference/technical paper due to the scope of a PTAR and resulting publication.
3. Aura Lee MacPherson – proposed research topic focused on residential, specifically a retrofit focus.
4. Robert Bean – proposed research topic idea on control valve types and implications on radiant system design and performance.

d. ALI & Education (Robert Bean)

- i. Robert Bean described existing ASHRAE ALI course on radiant systems, which could be re-run but would need to be substantial updating beforehand.

e. Handbook (Devin Abellon)

- i. Devin Abellon is creating a structure for collaborating on handbook chapters (e.g. Chapter 55) with the aim of completing it before the April 2022 meeting. Bulk of work focuses on Chapter 55, as this is the consolidation of two chapters. The aim is to have a draft ready for review in Phoenix. See presentation slides regarding chapter 55 workplan on Basecamp for detail.
- ii. 51 (Applications): Snow Melting and Freeze Protection. Was updated last publication. Requested volunteers to update again for 2023 edition.
- iii. 16 (Applications): Infrared Radiant Heating. Don Larsson has gathered volunteers to work on updating this chapter for 2024 edition. Currently deciding whether to redo the entire chapter, or take on a smaller scope of revision. Devin will organize a review of existing content.

f. Standards

- i. SSPC 90.1 Committee Liaison and Standard 138 (Richard Watson not present)
- ii. SSPC 55 Committee Liaison (Robert Bean). Stefano Schiavon and Robert described recent additions to standard 55 regarding ankle draft risk, stratification, and control classifications.
- iii. ISO/TC 205 Committee Liaison (Dr. Kim not present).

7 Old Business

- i. UMC. Lance MacNevin described proposed code changes to 2024 UMC, submitted by Lance as chair of working group in December. The focus of the changes is primarily to: remove 3degF above dewpoint requirement, add floor surface temperature requirement, remove mechanical code insulation requirement for low temperature difference systems, and add definition for “Chilled water”. Awaiting review and approval vote by UMC committee, prior to public comment period.
 1. **Action item:** Lance MacNevin to share proposed code changes on Basecamp.

8 New Business

- i. Ongun discussed revising TC 6.5 scope to highlight low temperature heating and high temperature cooling principle of radiant systems and other topics that the committee has focused more on in the past. Opened for discussion. Will draft and share proposed changes with committee for review.
- ii. Ongun discussed his plan as incoming Chair for TC 6.5. Reviewed feedback from members and summarized 3 main topics: handbook chapters, design guide, and controls/system integration. Goals and initiatives: broaden the committee, align with ASHRAE Strategic Plan, stronger collaboration with other committees, update handbooks, and generating content for Program. Will create an interim meeting for sub committees and other general matters to keep TC activities moving forward. Would like to add more technical content to future meetings. Will create and maintain a document on program, publication, and research ideas. [See Chair’s presentation on basecamp for more detail.](#)
- iii. Lance MacNevin – Highlighted that the Canadian code (B214) has been updated and is now available for purchase.

9 Liaisons introduction and reports – None present.

10 Adjourn

Meeting adjourned 4:30 PM EST.