



ASHRAE Technical Committee 4.1

**January 30, 2017
Committee Meeting Minutes
TC4.1 Load Calculation Data and Procedures
Monday, 2:15 PM to 4:15 PM
Las Vegas, NV**

1. Meeting called to order by Bob Doeffinger.
2. Roll Call – Secretary Suzanne LeViseur
 - a. 9 of 10 voting members present
3. Introduction of Visitors Bob Doeffinger
4. Approval and/or Corrections to St. Louis Meeting Minutes Bob Doeffinger
Jeff Spittler moved/Chip Barnaby seconded motion to approve the minutes
Vote: 9-0-0 CNV – 1 absent
5. Liaison Comments
Section Head Dennis Wessels, PE
 - Provided update, went over the handout provided at the TC chair’s breakfast.
(See attached).
New MTG – MTG.ACR – Air Change Rate – no TC4.1 representation
New/restructured TC MOP will be issued after Las Vegas meeting
Reminded us of the Roster Update Process & Deadline
TC Activity forms must be in before Wednesday, February 1
Chapter Technology Transfer Harris Sheinman, PE
 - Not present – no commentsResearch Prof. Xudong Yang
 - Not present – no commentsHandbook David P. Yuill
 - Not present – no commentsALI/PDC James W. Bochat
 - Not present – no commentsStandards Liaison James Dale Aswegan
 - Not present – no commentsStaff, Research/Tech Services Michael R. Vaughn
 - Not present – no commentsTAC Chairman Michael R. Bilderbeck
 - Not present – no comments



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6. Research Subcommittee Report Rolando Legarreta
See attached subcommittee report.
- Request to co-sponsor Research TC9.6
 - RP1681 – lighting – completed disposition form needs to be completed. Bob to complete
 - RP1729 – see Research Sub-committee report (Glenn Friedman reports about first kick-off meeting; principal investigator presented/talked about the schedule/modification wants to do a change in schedule. Chip Barnaby to provide code to investigator. Would like to reschedule the meeting to 1:30PM on Sunday. Glenn Friedman to let us know what he needs for rooms.
 - RP1742 – update from Christian Bach – new data updated quickly and Steve Bruning could update handbook. Discussion on discrepancies. Get the last chart to Steve Bruning for handbook by next week. Technical paper due.
 - RTAR 1816 – 6-0-0 CNV (our vote) in December. Approved with comments. (TC9.6 – is heading) Glenn Friedman volunteered to be TC4.1 representative for PSC and PMS.
 - URP1818 – under review in RAC – once they have completed their review, we will review their comments and implement them.
 - Design day weather approach – subcommittee will follow up with that at a later date.
7. Programs Subcommittee Report Glenn Friedman
See attached subcommittee report.
Current programs-
- BIM models 120 attendees – well attended; we got numbers not an experience to make people want to jump on it. Could be a good journal article.
 - Low Energy LED Lighting – surprising results.
- Future Programs – due MONDAY! For Long Beach. See his report.
- Update to Load Calculations Handbook Chapter Tables Tables as a program: Motion to approve as a program: Suzanne LeViseur moved/Rolando Legarreta seconded
Vote: 9-0-0 CNV – 1 absent.
8. Standards Subcommittee Report Glenn Friedman
See attached subcommittee report.
- Standard – 183 – methodology – joint standard with ACCA
Motion to reaffirm our sponsorship – Suzanne LeViseur moves/Chris Wilkins seconded
Vote: 9-0-0-CNV – 1 absent
 - Standard – 203 – test office equipment
Motion to reaffirm our sponsorship – Suzanne LeViseur moves/Jeff Spitler seconded
Vote: 9-0-0 CNV – 1 absent



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9. Handbook Subcommittee Report
Residential Chap 17
Non-Residential Chap 18
See attached subcommittee report.
Summary of Updates to Handbook
- Drafts are in – got extensions to get the tables in this week (non-res)
 - Kaiser paper – not in handbook this round. Larry Sun to follow up with author
 - LED seminar – generalizations didn't turn out as expected. Only research data will be published.
 - Azimuth angle calculations – Jim Pegues will pick up in next handbook revision cycle.
 - Warm-up issue with Larry Speilvogel – verbage to be added to the paragraphs in question indicating safety factors should be considered in these conditions. Chris Wilkins to work on this.
 - Research Project 1742 Completed.
Steve Bruning moves to accept RP1742 results/Suzanne LeViseur seconded
Vote: 9-0-0 CNV – 1 absent
10. ASHRAE Website for TC4.1
Website is up to date.
11. Old Business
None
12. New Business
Jim talked about a seminar this morning – beginning to promote Base Camp -
13. Adjournment
Motion to adjourn made by Steve Bruning / Seconded by Suzanne LeViseur
Vote: 9-0-0 CNV – 1 absent
- Chip Barnaby
Steve Bruning
- Jim Pegues
- Bob Doeffinger
- Bob Doeffinger
- Bob Doeffinger

Attachments:

- A. TC Section Chair Breakfast Handout
- B. Research Subcommittee Report
- C. Programs/Standards Subcommittee Report
- D. Handbook Subcommittee Report
- E. Las Vegas Agenda
- F. Las Vegas Sign-in Sheet

**Announcements and Reminders for TC/TG/TRG & MTG Chairs
LAS VEGAS 2017**

A. NEW!

1. 2016-2017 Hightower Award Recipient – Paul Lindahl, TC 3.6 & TC 8.6

Mr. Paul Lindahl's contributions to ASHRAE TC 3.6 and TC 8.6 in the past four years include being a handbook contributor to multiple chapters, a special liaison assignment to SSPC 90.1, and tours in various leadership positions on both TCs.

Mr. Lindahl's contributions to ASHRAE technical committees, and especially to TC 3.6 and TC 8.6 in the last four years, have been exemplary and make him a well deserving recipient of the George B. Hightower Technical Achievement Award.

2. 2016-2017 Service to ASHRAE Research Award Recipient - Joseph Huber, TC 1.3

Mr. Joseph Huber's contributions to ASHRAE TC 1.3 (Heat Transfer and Fluid Flow) in the past four years included being a contributor to multiple RTARs and work statements, Research Subcommittee chair for the TC, and Proposal Evaluation Subcommittee (PES) member, and Project Monitoring Subcommittee (PMS) member for multiple projects.

Mr. Huber's contributions to ASHRAE technical committees, and especially to TC 1.3 in the last four years, have been exemplary and make him a well deserving recipient of the Service to ASHRAE Research Award.

3. ASHRAE members for SY 16-17 now have free online access to ASHRAE's *Science and Technology for the Built Environment (STBE)* through their existing ASHRAE.org account

STBE is ASHRAE's archival research publication offering comprehensive reporting of original research in science and technology related to the stationary and mobile built environment, including indoor environmental quality, thermodynamic and energy system dynamics, materials properties, refrigerants, renewable and traditional energy systems and related processes and concepts, integrated built environmental system design approaches and tools, simulation approaches and algorithms, building enclosure assemblies, and systems for minimizing and regulating space heating and cooling modes. The journal also features review articles that critically assess existing literature and point out future research directions.

You can access your free online subscription to STBE through the ASHRAE website under the blue bar drop-down menu – *Resources & Publications*. ASHRAE will reassess the free access option on an annual basis and may discontinue access if interest is low.

4. New ASHRAE Technology Portal is Now Available

The new ASHRAE Technology Portal provides easier free member access to ASHRAE Journal articles and ASHRAE Research Reports through a new robust search feature. We will still sell the reports and articles in the bookstore for nonmember purchase. URL <http://technologyportal.ashrae.org>.

5. Peer Review of *Advanced Energy Design Guide for K-12 School Buildings: Achieving Zero Energy*

In partnership with AIA, IES, and USGBC and with support from the DOE, ASHRAE has embarked on a new series of Advanced Energy Design Guides focusing on achieving zero energy performance. The first guide in the series is for K-12 School Buildings. The project committee is finalizing the first draft in anticipation of the first peer review. The 65% Complete Technical Refinement Draft for the Advanced Energy Design Guide for K-12 School: Achieving Zero Energy will be available for review and feedback from February 6, 2017 to February 17, 2017. All review input must be received by February 19, 2017. Once received, the input will be compiled and then reviewed by the committee who will make changes to the draft based on that input. To participate in the review, please go to www.ashrae.org/freeaedg to download the review process instructions and review input form as well as a copy of the document for review (in pdf format). The draft will be available for download starting on February 6, 2017 through Friday, February 17, 2017.

6. One New Multidisciplinary Task Groups (MTGs) have been formed since St. Louis meeting

MTG.ACR – Air Change Rate

Scope: MTG.ACR will coordinate TC/TG/TRG/SSPC technical activities to help evaluate the technical basis and adoption of airflow rate specifications in terms of Air Change Rate (ACR) or Air Changes per Hour (ACH) for spaces such as cleanrooms, laboratories, patient rooms, operating rooms, and other similar spaces. Responsibilities include the development of research projects, development and presentation of technical programs for all types of spaces which currently require ACR specifications, and a special publication detailing aspects of the ACR philosophy and practice. The work of this MTG will potentially impact design guidelines, ASHRAE Handbook, and related ASHRAE standards. This MTG intends to involve other national and international groups and organizations in these efforts

The following committees and outside groups are currently represented on this MTG: TC 2.2, 4.3, 5.3, 5.8, 9.2, 9.6, 9.10, 9.11, SSPC 62.1, SSPC 170, I2SL, NIOSH, AIHA and potentially more that wish to also join.

The chair of this MTG is Kishor Khankari.

For more information on this new MTG and the nine other existing MTGs, please go to the MTG section on the following web page: <http://www.ashrae.org/tcs> .

If your TC would like to have a voting representative on a particular MTG, please contact the ASHRAE Manager of Research and Technical Services, Mike Vaughn, at MORTS@ashrae.net.

7. Updated TC Website Template – Initial Feedback, if any?

Since the Atlanta meeting, the Society's Electronic Communication Committee (ECC), ECC staff, TAC volunteers Gage and Cooper, and a consultant have been working to modernize and streamline the template for TC websites and now most of the TC websites have been moved to this new template. The new template so far includes

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WIZYWIG editing, automatic rosters, and simplified document uploading. There is no longer a need for HTML editing. If you have any feedback on the new template or suggestions for additional features, please let your Section Head and MORTS know.

8. **New Restructured TC MOP (Manual of Procedures) to be issued after Las Vegas Meeting**

TAC has restructured the TC MOP so that it is easier to navigate and find information.

9. **How to Import Your TC Roster Information into MS-Outlook**

Detailed instructions on how to import your TC roster information into MS-Outlook has been created and an e-mail announcement will be issued to all TC chairs, vice chairs, and secretaries once these instructions and the restructured TC MOP are posted to the TC page of the website (www.ashrae.org/TCs)

B. AT THIS MEETING

1. On-Site Training Options

i. **TC/TG/TRG Chair's Training Workshop Reminder**

Sunday January 29th, 9:45-10:45 AM in Roman I Room (Promenade Level) in the Caesars Palace Hotel. Roster Update training will be the primary topic of discussion, but other information for TCs will also be announced at this meeting. TAC is also interested in any feedback you have to offer on current TC programs and procedures.

ii. **RAC's Research Subcommittee Chair's Breakfast**

Monday, January 30th, 6:30 AM – 8:00 AM in Roman III Room (Emperors Level) in the Caesars Palace Hotel. Please encourage your Research Subcommittee Chair or another representative from the TC to attend this meeting so that your RAC Research Liaison (RL) can get an update on the TC's research activities and so that your RL can help resolve issues & questions that TC may have concerning their research program. The training portion of this meeting will focus on the duties and responsibilities of Project Monitoring Subcommittee members.

iii. **TC Program Subcommittee Chair Training in Las Vegas**

Tuesday, 1/31, 11:15 AM – Noon, in Forum 23 Room (Pool Level) in the Caesars Palace Hotel. *Don't complain about the meeting program and your TC's submissions if you have not been to training.*

A few things you might learn in training are as follows:

- Incomplete program submissions is the biggest reason for rejection now. All information is needed up front for CEC selection process.
- A packaged session on a similar topic is the best way to greatly improve your chances for acceptance.
- There is no difference in how CEC handles 60 and 90 minute program slots. 60 minute slots are just as good as 90 minute slots if complete

iv. **Handbook Training for TCs**

ASHRAE Authoring Portal

Sunday, 1/29, 8 AM to 9 AM, in Turin Room (Promenade Level) in the Caesars Palace Hotel.

This session will introduce the new ASHRAE Authoring Portal for collaborative work on Handbook chapters or other publications. The session will also show new TC Handbook chairs (and TC chairs) what they need to know about Handbook chapter development and revision—the process, the product, and how to succeed. Includes time for Q&A and discussion.

Volume/TC Meetings

Sunday, 1/29, 9 AM to 10 AM

2018 Refrigeration, Room: Forum 19 (Pool level)

2019 HVAC Applications, Room: Forum 3 (Pool level)

2020 HVAC Systems and Equipment, Room: Forum 18 (Pool level)

The agenda for these Handbook-volume-specific meetings will include topics of interest/applicability to all chapters, plus time for Q&A and individual consultation between Handbook Committee liaisons and TC Handbook chairs. Liaisons will still do their best to attend TC Handbook Subcommittee meetings for additional consultation as needed.

We know some TCs have chapters in more than one volume. If your TC has chapters in more than one volume, **you should go to the volume meeting for the chapters that are due the soonest**. And if your TC hasn't appointed a Handbook Subcommittee chair or representative who can attend one of these meetings, now would be a great time to do so.

On behalf of the Handbook Committee, staff, and ASHRAE Handbook users everywhere, thank you for your continuing dedication to this effort.

v. **Seminar 30 – Electronic Project and Document Management: An Introduction and ASHRAE's System**

Monday, 1/30, 11 AM to 12 PM, in Augustus III/IV Room (Emperors Level) in the Caesars Palace Hotel.

- Basecamp Fundamentals – Cynthia Callaway, P2S Engineering Inc., Long Beach, CA
- ASHRAE Authoring Portal – Mark Owen, Handbook Editor, ASHRAE, Atlanta, GA

2. **Location of Section Head Mailboxes & Free Wi-Fi Access at this Society meeting**

Mailboxes are located just outside ASHRAE Headquarters Office (Forum 8-10 – Pool Level – Caesars Palace Hotel).

Also, Internet access and computers for e-mail are available in the Cyber Café located in the registration area (Palace I, Emperors Level, of the Caesars Palace hotel) during operating hours. Please be considerate to others and limit your usage to five minutes.

Wireless internet will be available in all meeting rooms at Caesars Palace. ASHRAE will be working with the internet provider to manage the bandwidth so that member

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expectations of accessibility and speed are fulfilled. We would like to request that everyone limit their usage to functions that do not use excessive bandwidth. Applications such as Facebook, YouTube, streaming video, etc. use excessive bandwidth. Wi-Fi Access: ashrae2017 is the network, lasvegas is password (case sensitive).

3. RPM (Remote Participation Meetings) being held in Las Vegas

The 11th RPM beta test (Remote Participation Meetings – Formerly known as E&P meetings), which allows some TC members to participate in the TC meeting from a remote location electronically, will occur in Las Vegas and the following twelve TCs have agreed to participate in this test: TC 4.2, TC 4.5, TC 6.8, TC 7.3, TC 7.8, TC 7.9, TC 9.2, TC 9.4, TC 10.3, TC 10.6, MTG.CCDG, and MTG.LowGWP – In addition to these TCs, 19 PCs and 2 Ad hoc committees also hosted RPM meetings in Las Vegas. Overall, RPM requests exceeded our capacity on Monday and Tuesday with six RPM sets, but I'm happy to report that 4 additional RPM sets will be purchased for use at the Long Beach meeting. This will allow us to host 10 RPM meetings simultaneously in Long Beach. The chairs of those TCs participating should provide to their Section Head feedback on their RPM meeting experience before TAC meets on Wednesday morning, 2/1.

C. UPCOMING DEADLINES

1. 17-18 Roster Update Process & TC Input Deadline

Remember, the current 2016-2017 roster for your TC, TG or MTG is in effect until after the June meeting this year. The new committee rosters for Society year 2017-2018 will be created based upon the update information that each TC, TG or MTG provides to their section head at this meeting by midnight, Tuesday, 1/31/17 and these new rosters will go into effect on July 1, 2017. Please see your section head for the 2017-2018 Roster Update form if you still need a copy.

2. TC Activity Forms for the Las Vegas Meeting are due to Your Section Head before Wednesday, 2/1/17

TC/TG/TRG Activity Feedback Form (Excel) can be downloaded from the Technical Committee webpage under the "TC Forms and Documents" page - <https://www.ashrae.org/standards-research--technology/technical-committees/tc-forms-and-documents>. Section heads can also provide an electronic copy of the form if requested.

3. Seminar and Forum proposals for Long Beach are due by Monday, February 6th, 2017. Please visit the following site to submit your proposal:

For more information, go to: www.ashrae.org/LongBeach.

D. REMINDERS

1. **16-17 Rosters Access & Distribution** - Remember, the current 2016-2017 roster for your TC, TG or MTG is in effect until after the June meeting this year – through Friday, June 30th.

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By now, each TC, TG and MTG chair should have received a PDF & MS-Excel file of their new 2016-2017 roster from their Section Head or staff for distribution to the committee. In addition, each member can view all of the rosters of their committees on the ASHRAE Website. Go to www.ashrae.org <http://www.ashrae.org>, click on the "Membership & Conferences" tab in the header, click on "My Membership" text in the left sidebar, and log in (if you have not logged in lately, you might need to set up a new username and password). Click on the "Update Your Bio / View or Edit Your Profile" link. Now, you should see your current "bio info". Click on "Committees" on the left sidebar; all of the committees you are a member of will appear. Click on the "blue" roster text at the left hand side of a committee to reveal the roster with linked contact information. Make sure everyone on your committee also knows how to access the roster.

The Provisional Corresponding Member (PCM) position is a relatively new position on TC/TG/TRG rosters. This position allows potential new members to be added by staff to the committee roster any time a request for membership is made by an individual. The position has a 2-year term on the committee. Staff will notify the chair and reissue a new roster to the committee chair any time a provisional member is added. The TC/TG/TRG chair has the option each year during the regular roster update process to convert provisional CMs that have been active participants on the committee the past year into regular CMs or voting members or drop them. If no action is taken, they will time expire from the roster and be removed by staff.

- 2. Useful TC/TG/TRG/MTG Chair Information and forms on ASHRAE website**
Information for TC/TG/TRG and MTG chairs can be found on the Technical Committee page of the ASHRAE website at the following link: <http://www.ashrae.org/tcs>

An updated draft of the TC/TG/TRG Manual of Procedures (MOP) is being considered for approval by TAC at the Las Vegas meeting and it is expected to be posted soon to this site and announced to all TC chairs once posted.

- 3. Request for each TC to briefly review ASHRAE Code of Ethics at start of meeting**
See the following link for the latest version of the ASHRAE Code of Ethics:
<https://www.ashrae.org/about-ashrae/>
- 4. Make a Special Effort to welcome new Members, and Visitors to TC meeting**
Potential new members for your committee have been encouraged to drop-by your meeting. As a result, please make a special effort to recognize and warmly welcome all visitors to your meeting – A TC can never have too many willing and able volunteers.
- 5. Option for TC Subcommittee Meetings via Conference Calls and Web Meetings**
More and more TCs are taking advantage of a new Society service that allows TCs to hold subcommittee meetings by phone and/or web. Many TCs are finding this to be a more efficient way for them to conduct subcommittee business and it also allows TC members that can't travel to meetings on a regular basis a way to still contribute to the TC. Such a change can also eliminate potential conflicts with the TC's program sessions at Society meetings. Please pass your conference call/web meeting/webinar requests on to the Manager of Research and Technical Services, Mike Vaughn, at mvaughn@ashrae.org or MORTS@ashrae.net

6. Is Your Committee Website up to Date?

If not, please ask your webmaster to at least post the latest minutes and the Las Vegas meeting times and agenda. If your website has been neglected, add an action item for this meeting to appoint a responsible member of the TC/TG/TRG who will bring it back to life. The new TC website template has greatly simplified the duties of the TC webmaster and this form of communication is critical to the efficient operation of your committee, and for attracting new members.

The recent conversion to a new TC website platform highlighted a couple areas where a refresher of the ASHRAE rules on website maintenance is warranted. First be aware that ASHRAE Products (i.e., handbook chapters, journal articles, final reports from research projects, etc.) cannot be published on your TC's website. It is very appropriate to post the title and scope of the product and then link the reader to the ASHRAE bookstore or other location on the ASHRAE site where the product may be purchased. Any possible exceptions to this rule must be sent through Steve Comstock for review and approval (scomstock@ashrae.org). The second issue involves timely posting of the draft minutes. Draft minutes (and final, approved minutes from the prior meeting) should be posted to your website (or otherwise distributed to the members) within 60 days after the meeting. Please ensure that your secretary and webmaster are aware of this deadline. To assist your secretary in understanding the procedures for taking and reporting minutes, a video has been developed and posted on the Technical Committees' Training page (<https://www.ashrae.org/standards-research--technology/technical-committees/tc-training-and-presentations>). On the same page, a video has also been posted for use by webmasters to learn about the procedures and schedules for maintain the new websites.

7. TC 2016-2017 Master Calendar – Now Available through Google - The Technical Committee Master Calendar is now available through Google. In order to access this calendar you need to have a Google account.

Once you log into your Google account, follow the instructions below:

To add a friend's calendar, just follow these steps:

- At the bottom of the calendar list on the left, click Add and select Add a friend's calendar.
- Enter the appropriate email address (techservices1791@gmail.com) in the field provided, then click Add.

This calendar is public and will appear under 'Other Calendars' in the left column.

To set up Google Calendar Sync to your Outlook:

- Make sure you're using a supported operating system and Outlook version.
- Download Google Calendar Sync (version 0.9.3.6) at
- http://dl.google.com/googlecalendarsync/GoogleCalendarSync_Installer.exe
- Once a dialog box appears, click Save File. The downloaded file should open automatically. If it doesn't, manually open it from your browser's download window.
- Click OK to confirm that you're aware this is an executable file.
- Read through the Google Calendar Sync Terms of Service, and click I Agree.
- Follow through the Installation Options and click Install to finish the set-up process.

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Once Google Calendar Sync is installed on your computer, the Google Calendar Sync Settings window will appear:

In the Settings window, enter your email address and password and select the Sync Option you prefer. Read about each Sync Option.

You'll also be able to set the time interval for syncing to occur. Please keep in mind that 10 minutes is the minimum time interval allowed.

After the initial set-up, you can access the Google Calendar Sync Settings window again by double-clicking the calendar icon in your Windows System Tray.

E. RECENT ANNOUNCEMENT

1. RAC Prioritizing Research Topics Related to the Residential Sector

In 2015-2016, RAC started prioritizing for bid accepted research topics that support Goal #3 below from the Research Strategic Plan.

Goal #3: To reduce significantly the energy consumption for HVAC&R, water heating and lighting in existing homes.

2. CEC's Standing Request for Future Society Meeting Program Track Suggestions

The Conferences and Expositions Committee (CEC) oversees ASHRAE's annual and winter conferences and other specialty conferences and expositions globally. The CEC continually works to improve the conference experience for all attendees. To help keep a "pulse" on the technical issues facing professionals in the HVAC&R marketplace, and to create meetings that reach all of ASHRAE's constituencies, the CEC seeks ideas for tracks for the Houston 2018 meeting and annual and winter conferences beyond as well as topics for specialty conferences from TC members.

Please submit your suggestions to ASHRAE Staff member Tony Giometti (Giometti@ashrae.org). You can also add your track suggestion in the "Comment" section of the TC Activity form for the Las Vegas meeting.

CEC is particularly interested right now in getting suggestions for the 2018 Annual Meeting Program in Houston, TX. Please submit your suggestions before February 20, 2017.

3. CEC Always Seeks TC Volunteers willing to Support Content Development and Quality Control for Society Technical Program at Society Meetings

Provide to your Section Head after each Society meeting a list of qualified volunteers from your TC that are potential Technical Session chairs and reviewers of session papers that are related to TC's scope for use by the Conferences & Expositions Committee (CEC) in developing technical content for future technical programs.

There is also now a link on the following webpage of the ASHRAE website where you can volunteer online to be a paper reviewer: <https://www.ashrae.org/membership--conferences/conferences/papers-and-programs#reviewers>

4. TAC Presentation Template for TC members to use with local Chapter

TAC developed a presentation template that allows TC members, without a lot of effort, to give a presentation to their local chapter on TAC and the TCs in general and to also customize a few slides with information specific to their own TC or TCs. The template is posted on the Technical Committee page of the ASHRAE website for download under the heading "General TC Information."

5. The Professional Development Committee (PDC) is seeking ideas for new ASHRAE Learning Institute (ALI) courses.

The need is for practical courses of broad interest to be presented as face-to-face seminars or short courses, instructor-led online courses and self-paced courses. Examples would include courses with a focus on new technologies that need to be shared, fundamentals that may have been forgotten, standard applications that need explanation, and courses based on new design guides.

The objective of the ASHRAE Learning Institute (ALI) is to provide quality, authoritative and practical technical information of broad interest.

Contact Karen Murray (ASHRAE staff) at kmurray@ashre.org with new course ideas.

F. CURRENT & UPCOMING ASHRAE CONFERENCE PROGRAMS

1. Program Focus at Las Vegas Winter Conference

The Las Vegas Conference Technical Program addresses a wide variety of topics in the application of technology to practice. Specific program tracks are as follows:

Program Focus at Las Vegas Winter Conference

- i. Track 1: Fundamentals and Applications
- ii. Track 2: HVAC&R Systems and Equipment
- iii. Track 3: Water-Energy Nexus
- iv. Track 4: Commercial and Industrial IAQ
- v. Track 5: Mission Critical Design and Operation
- vi. Track 6: Effects of Climate Change on HVAC&R
- vii. Track 7: Energy Efficient Industrial Buildings
- viii. Track 8: Building Operation and Performance

2. Long Beach Annual Conference - June 24 – June 28, 2017

Seminar and Forum proposals for St. Louis are due by **Monday, February 6th, 2017.**

Conference Website: www.ashrae.org/LongBeach

Conference Program Chair: Ann Peratt Email: ann.peratt@gmail.com

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Program Focus at Long Beach Annual Conference

- i. Track 1: Fundamentals and Applications
 - ii. Track 2: HVAC&R Systems and Equipment
 - iii. Track 3: Refrigeration
 - iv. Track 4: Building Life Safety Systems
 - v. Track 5: Controls: Smart Building Systems and the Security Concerns as Technology Emerges
 - vi. Track 6: Commissioning: Optimizing New and Existing Buildings and their Operation
 - vii. Track 7: Net Zero Energy Buildings: The International Race to 2030
 - viii. Track 8: Residential Buildings: Standards and Guidelines and Codes
 - ix. Track 9: Research Summit
3. **CEC Seeks Program Tracks Suggestions for the 2018 Annual Meeting in Houston, TX**
CEC is seeking track suggestions for the 2018 Annual meeting technical program. If you have a suggested track, please pass it on to Tony Giometti, staff liaison to CEC, at PRGstaff@ashrae.net before February 20, 2017.

Additional information on past, present, and potential future tracks can be found at the end of this handout as additional information

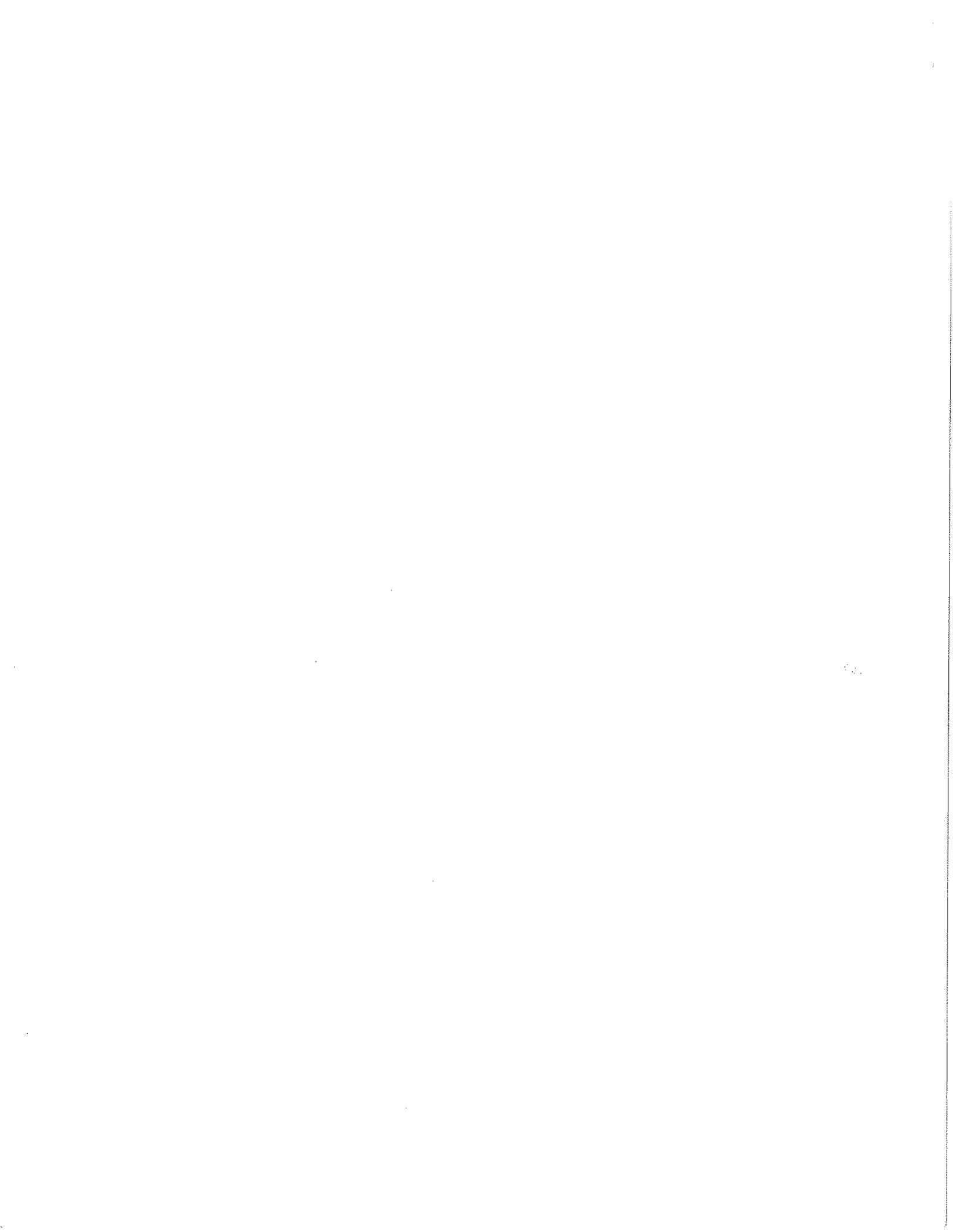
G. OTHER UPCOMING WORKSHOPS, CONFERENCES AND EVENTS

1. 2017

- i. **2017 ASHRAE Winter Meeting** – Jan. 28 to Feb. 1, 2017 – Las Vegas, NV USA – Contact: <http://ashraem.confex.com/ashraem/w17/cfp.cgi>
- ii. **2nd International Conference on Energy and Indoor Environment for Hot Climates** - February 26 - 27, 2017 - Doha, QATAR – Contact: <https://www.ashrae.org/membership--conferences/conferences/ashrae-conferences/energy-and-indoor-environment-for-hot-climates>
- iii. **2017 American Society of Thermal and Fluids Engineers (ASTFE) Conference and 4th International Workshop on Heat Transfer (IWHT)** – Apr. 2 – Apr. 5, 2017 – Las Vegas, NV USA – Contact: <http://www.astfe.org/afec2017/>
- iv. **Sustainable Management of Refrigeration Technologies in Marine and Off-Shore Fisheries Sectors** – April 6-8, 2017 - Bangkok, Thailand – Contact: <https://www.ashrae.org/membership--conferences/conferences/ashrae-conferences/marine-2017>

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- v. **Take Control: Using Analytics to Drive Building Performance Webcast** – Apr. 20, 2017 – 1 pm to 4 pm EDT – Contact: www.ashrae.org/webcast
- vi. **Beyond NZEB: Retrofit of Existing Buildings** – May 10 - 11, 2017 – Matera, ITALY - Contact: <http://www.aicarr.org/Pages/EN/Upcoming%20Events/2016/50AiCARR.aspx>
- vii. **Climamed 2017** – May 12 – 13, 2017 – Matera, ITALY – Contact: http://www.aicarr.org/Pages/Convegna/CLIMAMED_2017/Call_for_papers.aspx
- viii. **12th IEA International Heat Pump Conference** – May 15 to May 18, 2017 – Rotterdam, NETHERLANDS – Contact: <http://hpc2017.org/> See attached brochure for additional information.
- ix. **2017 ASHRAE Annual Conference** – June 24 – June 28, 2017 – Long Beach, CA USA – contact: <https://ashraem.confex.com/ashraem/s17/cfp.cgi>
- x. **Building Simulation 2017** – Aug. 7 – Aug. 9, 2017 – San Francisco, CA USA – Contact: <http://www.buildingsimulation2017.org/>
- xi. **ISHPC2017** – Aug. 7 – Aug. 10, 2017 – Tokyo, JAPAN – Contact: <http://biz.knt.co.jp/tour/2017/ISHPC2017/congress.html>
- xii. **ASHRAE Building Performance Analysis Conference** – September 27-29, 2017 – Atlanta GA, USA – Contact: <https://ashraem.confex.com/ashraem/bpa17/cfp.cgi>
- xiii. **2nd ASHRAE Developing Economies Conference** – Nov. 10-11, 2017, Delhi, INDIA – Contact: <https://ashraem.confex.com/ashraem/de17/cfp.cgi>



Track No.	Cindy Moreno A2018 Houston	Michael Collarin W2018 Chicago	Ann Peratt A2017 Long Beach	Leon Shapiro W2017 Las Vegas	Tom Kuehn A2016 St. Louis	Jennifer Leach W2016 Orlando
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1	Fundamentals and Applications	Fundamentals and Applications	Fundamentals and Applications	Fundamentals and Applications	Advances in Refrigeration Systems and Alternative Refrigerants	<u>Systems and Equipment</u>
2	HVAC&R Systems and Equipment	HVAC&R Systems and Equipment	HVAC&R Systems and Equipment	HVAC&R Systems and Equipment	Research Summit	<u>Fundamentals and Applications</u>
3	District Energy and Cogen Plants	Standards, Guidelines and Codes	Refrigeration	Water-Energy Nexus	Fundamentals and Applications	<u>Design Build</u>
4	Safeguarding your HVAC&R System	Earth, Wind & Fire	Building Life Safety Systems	Commercial and Industrial IAQ	HVAC Systems and Equipment	<u>International Design</u>
5	Residential: Modern Buildings in Hot and Humid Climates	Beyond the "L": IAQ and Air Conditioning in Transportation Applications and Enclosed Vehicular Facilities	Controls: Smart Building Systems and the Security Concerns as Technology Emerges	Mission Critical Design and Operation	Smart Building Systems/Remote Monitoring and Diagnostics	<u>Standards, Guidelines and Codes</u>
6	Professional Skills	Tall Buildings	Commissioning: Optimizing New and Existing Buildings and their Operation	Effects of Climate Change on HVAC&R	Indoor Environment: Health, Comfort, Productivity	<u>Cutting Edge Technologies</u>
7	Controls: Troubleshooting Building Management Systems	Modeling Throughout the building Life Cycle	Net Zero Energy Buildings: The International Race to 2030	Energy Efficient Industrial Buildings	Professional Skills Beyond Engineering	<u>The Great Debate</u>
8	Research Summit	Performance and Design of Heat Exchange Equipment under Real Field Type Conditions	Residential Buildings: Standards Guidelines and Codes	Building Operation and Performance	Renewable Energy Systems and Net Zero Buildings	<u>Modern Residential Systems</u>
9		Refrigerant Mini Track @ Expo	Research Summit			

David Claridge A2015 Atlanta	Doug Cochran W2015 Chicago	Mike McDermott A2014 Seattle	Jon Cohen W2014 New York	Sarah Maston A2013 Denver	W2013 Dallas
<u>HVAC&R Systems & Equipment Applications</u>	<u>Systems & Equipment</u>	<u>Indoor Environment – Health, Comfort and Productivity</u>	<u>Systems and Equipment</u>	Research	<u>HVAC&R Systems & Equipment</u>
<u>HVAC&R Fundamentals & Applications</u>	<u>Fundamentals & Applications</u>	Research Summit	<u>Fundamentals and Applications</u>	Research	<u>HVAC Fundamentals and Applications</u>
Research Summit	<u>Industrial Facilities</u>	<u>Ground Source Heat Pumps State of the Art: Design, Performance and Research</u>	<u>Environmental Health Through IEQ</u>	<u>Integrated Project Delivery</u>	<u>Standards, Guidelines and Codes</u>
Refrigeration	<u>Large Buildings: Mission Critical Facilities and Applications</u>	<u>HVAC&R Systems & Equipment</u>	<u>Building Information Systems: Integrating technology for control, management, optimization and efficiency</u>	<u>Building Energy Modeling vs. Measurement & Verification- Closing the Gap</u>	<u>Energy Conservation</u>
<u>Building Operation, Maintenance, and Optimization/Commissioning</u>	<u>Energy Efficiency</u>	<u>HVAC&R Fundamentals and Applications</u>	<u>International Design</u>	<u>Mid-High Efficiency & Equipment Refrigeration</u>	
<u>Indoor Air Quality</u>	<u>Life Safety</u>	<u>Standards, Guidelines and Codes</u>	<u>Building Performance and Commissioning for Operation and Management</u>	<u>Renewable & Alternative Energy Sources</u>	<u>Large Building Design</u>
<u>Modeling Throughout the building Life Cycle</u>	<u>Design of Energy and Water Efficient Systems</u>	Refrigeration	<u>Hydronic System Design for Efficiency and Large Buildings</u>	<u>HVAC&R Systems & Equipment</u>	<u>Facility Management, Operations, Technology and Energy Improvements</u>
<u>High Performance Buildings</u>	<u>Hospital Design & Codes</u>	<u>Installation, Commissioning, Operation, Maintenance of Existing Buildings</u>	<u>Tall Buildings: Performance Meets Policy</u>	<u>HVAC&R Fundamentals & Applications</u>	<u>Industrial & Transportation Ventilation</u>
<u>Moving AEDG's into the Mainstream</u>		<u>Professional Skills</u>			

TC 4.1 Programs/Standards Discussion
St. Louis, Sunday, June 27, 2016

Glenn Friedman, Program Chair

PROGRAMS

1. Current Programs

- a. The Current State of the Art for an Automated Pathway from BIM Building Models Direct to HVAC Heating/Cooling Load Calculations. Co-sponsored by MTG- BIM (MTG=Multidisciplinary Task Group).
 - i. Define the Baseline for BIM Loads Comparison. Speaker Steve Bruning
 - ii. Heating and Cooling Load Calculations from BIM Using Autodesk Insight 360. Speaker Krishnan Gowri
 - iii. Performing Load Calculations in AECOsim Energy Simulator Using a gbXML File Exported from Revit. Speaker Dru Crawley
 - iv. The Process of Using gbXML to Export the ASHRAE HQ Revit Model to Trace to Perform HVAC Load Calculations. Speakers Stephen Roth

This BIM to Loads seminar would be a good journal article. Stephen Roth, Steve Bruning and Krishnan Gowri expressed interest in doing this.

- b. Low Energy LED Lighting Heat Gain Distribution in Buildings Seminar (ASHRAE RP-1681).
 - i. Approach, Test Setup, and LED Luminaire Selection for Testing LED Lighting Heat Gain Distribution. Speaker Ran Liu
 - ii. Test Results of LED Lighting Heat Gain Distribution and Comparison to Conventional Lighting. Speaker Xiaohui Zhou
 - iii. Field Application of LED Lighting Heat Gain Distribution Data. Speaker Steve Bruning
- ### 2. Future Program, June 2017, Long Beach (Long Beach is summer when handbook comes out), Submission Proposals Due February 6, 2017
- a. Future Seminar Session Proposals
 - i. Seminar on Updates to Load Calculation Handbook Chapter Tables. Approved.
 - a. Speaker #1 Christian Bach on Testing Method for Office Equipment Heat Gains
 - b. Speaker #2 Christian Bach's grad student on Testing Results Handbook Updates for Office Equipment Heat Gains
 - c. Speaker # Rolando or 5.10 Kitchen Ventilation speaker on Testing Results Handbook Updates for Kitchen Equipment Heat Gains
 - b. Future Program Ideas
 - i. Atrium and large space load calculations, empirical case studies
 - ii. Ventilation and infiltration
 - iii. How Load Calculations Interact with Other ASHRAE Chapters
 - Weather
 - Infiltration
 - Building skin color
 - Ventilation
 - Fenestration, dynamic windows

STANDARDS

1. We need to reaffirm our sponsored ASHRAE Standard 183-2007. A motion was made by Glenn Friedman with a second by Larry Sun. No action need be taken at this time. We will vote on this item in Las Vegas.
Should a standard define the minimum reporting for Load Calculations? We recommend we reaffirm and then propose to add this as a revision. Does ACCA need to reaffirm this? We don't know. Jim Aswegan, our Standards Liaison with research this question,
 2. We need to reaffirm our sponsored ASHRAE Standard 203-2014. A motion was made by Glenn Friedman with a second by Larry Sun. No action need be taken at this time. We will vote on this item in Las Vegas.
-

Long Beach Program Tracks

Upcoming Conference Deadlines

- Website Opens for Seminar, Forum, Panel, Debate and Workshop Proposals January 2, 2017
- Conference Paper Accept/Revise/Reject Notifications Due January 16, 2017
- Seminar, Forum, Workshop, Debate and Panel Proposals Due February 6, 2017

- **Track 1: Fundamentals and Applications**

Track Chair: Frank Schambach

Email: frankschambach@mindspring.com

It's back to the basics! This track provides the foundation for design and construction of HVAC&R components and their application. This track seeks papers and programs of varying levels to provide discussion on theories, models, designs and shared experiences. Topics may range from fan laws and psychometrics to room air distribution and heat transfer and much more.

- **Track 2: HVAC&R Systems and Equipment**

Track Chair: Jennifer E. Leach

Email: pennst8jen@yahoo.com

What system and equipment are best for my building? Selection of equipment and design of systems is critical for effective HVAC&R operation and usually has more than one right answer. This track will provide engineers, designers, contractors, owners and building operators the tools to properly design, select and operate traditional, non-traditional and hybrid equipment and systems. The papers and programs within this track may range from basic concept to the technical analysis of system performance.

- **Track 3: Refrigeration**

TC 4.1 Programs/Standards Discussion
St. Louis, Sunday, June 27, 2016

Track Chair: Vikrant Aute

Email: vikrant@umd.edu

The refrigeration cycle is a key component to our daily needs, as it is used for thermal comfort, food storage, creating ice and medicinal needs. There have been numerous improvements and changes to refrigeration systems and refrigerants to accommodate the increased system efficiency and reduce environmental impact. This track seeks papers and programs that address the wide range of developments and applications of refrigerants, including alternative lower-GWP refrigerants, variable refrigerant flow applications, refrigerant management and food storage.

- **Track 4: Building Life Safety Systems**

Track Chair: Robert Alan Neely

Email: alan_neely@pghcorning.com

Building life safety systems are critical in commercial facilities to protect building occupants from fires and power outages. This track focuses on building egress, fire protection systems, fire alarms, emergency lighting, fire and smoke barriers, and special hazard protection and describes key factors to consider when designing these life safety systems. Papers and programs are sought to evaluate design strategies for the life safety systems noted above along with building specific life safety systems, such as gas detection systems, kitchen ventilation and smoke evacuation systems, etc.

- **Track 5: Controls**

Track Chair: Melanie Derby

Email: derbym@ksu.edu

This track will explore smart building systems and how they can be incorporated into commercial facilities to help reduce energy consumption and improve occupant comfort. As owners and designers incorporate more controls systems with web and cloud access into buildings, there is a concern that this allows more opportunities for hackers to gain access into sensitive and confidential databases. The track will include programs about effective building controls, integration of multiple building systems (ie HVAC, lighting, security, water consumption, etc.), along with measures to keep this information safe, while maintaining the flexibility of remote control/access of building systems.

- **Track 6: Commissioning: Optimizing New and Existing Buildings and their Operation**

Track Chair: Dennis Alejandro

TC 4.1 Programs/Standards Discussion
St. Louis, Sunday, June 27, 2016

Email: denzjac@yahoo.com

High efficiency building systems come at a cost, and after the owner's initial investment it is important to verify that the system components are operating as the designer intended. Secondly, the systems need to be operated properly to reach and maintain the system efficiency levels. This track seeks papers and programs providing lessons learned and recommendations for successful commissioning projects. This track also seeks case studies of existing buildings with a retro-commissioning plan to reduce energy consumption and evaluate the payback of these modifications.

- **Track 7: Net Zero Energy Buildings: The International Race to 2030**

Track Chair: *Jason DeGraw*

Email: jason.degraw@nrel.gov

Title 24 and Architecture 2030 have ambitious goals for all commercial buildings in California to be Net Zero Energy (NZE) by the year 2030. This track will assist the design team and owners to evaluate various systems (including HVAC, building envelope, lighting, domestic water and renewable energy system), design strategies, construction measures and building operation to achieve NZE. The programs within the track will also explore the advancing code and regulations that countries around the world are implementing to reduce building energy consumption.

- **Track 8: Residential Buildings: Standards Guidelines and Codes**

Track Chair: *Kimberly Pierson*

Email: kdpwildcat@gmail.com

ASHRAE is known for its standards and design guidelines and their evolution to improving the built environment and its systems. This track will inform designers, contractors and owners of the current requirements and upcoming changes to ASHRAE's low-rise residential guidelines: Standard 90.2, Standard 62.2 and Guideline 24. This track also seeks papers and programs for cutting-edge residential systems and the incorporation of ASHRAE standards in the design.

- **Track 9: Research Summit**

Track Chair: *Ann Peratt*

Email: ann.peratt@gmail.com

The fifth annual Research Summit brings together distinguished researchers to present the latest research results. Papers are requested on the following topics: 1) building science research that address the performance of buildings systems and occupant usage and 2) renewable energy research and its impact as we move towards net zero energy buildings.

TC 4.1 Programs/Standards Discussion
St. Louis, Sunday, June 27, 2016

Conference Program Chair: Ann Peratt

Email: ann.peratt@gmail.com

Staff Support

For information on the technical program, special events, special sessions and general conference inquiries

Tiffany D. Cox

Assistant Manager of Conference Programs

Email: tcx@ashrae.org



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TC4.1 Load Calculation Data & Procedures

Las Vegas, Nevada

January 28 – February 1, 2017

Handbook Subcommittee Report

Sunday, January 29, 2017 3:00 PM to 4:00 PM

Promenade, Consul Boardroom

1. Handbook Committee Liaison Comments: David Yuill, Liaison to TC4.1.
2. Schedule for 2017 HoF Chapters:
 - 2017 January 17 – Chapter 17 submitted to Yuill/ASHRAE
 - 2016 Aug 2 – Chapter 18 submitted to Yuill/ASHRAE
 - 2017 March – Galley proofs expected from HQ
 - 2017 June – HoF Published
3. Chapter 17 Residential Loads Remaining Issues:
 - a. Chip Barnaby reported Chapter has been submitted. HQ expects galleys in April and will require one week turnaround on proofing.
4. Chapter 18 Non-Residential Loads Remaining Issues: Steve Bruning
 - a. Due to inconsistencies in the peak and average measured watts/sf in the Kaiser paper it was decided to leave this information out of the handbook chapter until further clarifications with author can be confirmed.
 - b. As part of preparation for LED Seminar, Bruning had his staff gather research data for LED lighting values applied to open office space, and data is quite varied. It was suggested to leave this out of chapter. We will have data from RP1681 in the chapter.
 - c. Solar azimuth angle calculation in Chapter 14 was pointed out to be different than ours. Bruning did manual calculation that results in a very close numerical agreement. Due to impacts to handbook examples etc. it was decided not to make this change and save it for next iteration of chapter update.
 - d. Heating warm-up factors concerns were brought to committee by Larry Spielvogel. With newer tighter construction and intermittently occupied buildings, there is a concern that building systems do not have enough capacity to cool down/warm up, as a result operators are running systems longer (or continuously) to maintain building conditions. Larry suggests adding verbiage for safety factors

addressing these types of conditions. There was a lot of discussion as to how specific this should be. Should we be providing an actual factor? Research would probably be required to come up with actual values. All agreed it was ok to add these items to the paragraph in question.

- e. Plug load research from RP-1742 (Christian Bach - OSU) related to Tables 8, 9 & 10 of 2013 Handbook is complete and updated data was presented. There was discussion of changing 1st column to read nameplate, as opposed to "peak" to avoid confusion with 2nd column "15 minute peak". This would apply to all tables.
- There was a question raised about laptop measurements while plugged in but on battery operation. Wilkins pointed out that in previous Hosni research it was determined that there was not a great difference.
 - Agreed to replace Table 8 with new Table 1, 2, 3 & 4 from RP-1742 report.
 - Table 9 will be replaced with Table 5 from RP-1742 report.
 - There may be an error in "correlation for screen power consumption" calculation, do we actually need this, or should we leave out? No one at meeting has ever used calculation, and since it is an extrapolation of our data, it would be better to leave out so that people seek data for unusual cases, such as curve big screen monitors. Also equation (7) and CRT paragraph on page 18.10 will be removed.
 - Table 10 will be replaced with Table 6 from RP-1742 report for updated miscellaneous office equipment.
 - Table 11 for Load Factors in various Offices could be replaced with Table 11 from RP-1742 report. There was some concern with how new values relate to current table because they are now higher. Christian will double check data.
 - Table 12 Diversity Factors is replaced by Table 7 from RP-1792 report. Chris pointed out that "screen" diversity factors may not be accurate due to smaller sample size.
 - Bruning commended the research team for their extraordinary efforts in pulling new data together in time for inclusion in HOF.



ASHRAE Technical Committee 4.1

Agenda for - TC4.1 Load Calculation Data & Procedures

Las Vegas
January 30, 2017

TC4.1 Load Calculation Data and Procedures
Monday, 2:15 PM to 4:15 PM
Turin – Prom Floor - Caesars

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|---|---|
| 1. Call to Order | Bob Doeffinger |
| 2. Roll Call | Suzanne LeViseur |
| 3. Introduction of Visitors | Bob Doeffinger |
| 4. Approval and/or Corrections to St. Louis Meeting Minutes | Bob Doeffinger |
| 5. Liaison Comments
Section Head
Chapter Technology Transfer
Research
Handbook
ALI/PDC
Standards Liaison
Staff, Research/Tech Services
TAC Chairman | Dennis Wessels, PE
Harris Sheinman, PE
Prof. Xudong Yang
David P. Yuill
James W. Bochat
James Dale Aswegan
Michael R. Vaughn
Michael R. Bilderbeck |
| 6. Research Subcommittee Report
Co Sponsor Research TC9.6 | Rolando Legarreta |
| 7. Programs Subcommittee Report | Glenn Friedman |
| 8. Standards Subcommittee Report | Glenn Friedman |
| 9. Handbook Subcommittee Report
Residential Chap 17
Non-Residential Chap 18
Updates to Handbook | Chip Barnaby
Steve Bruning |
| 10. ASHRAE Website for TC4.1 | Jim Pegues |
| 11. Old Business | Bob Doeffinger |
| 12. New Business | Bob Doeffinger |
| 13. Adjournment | Bob Doeffinger |



ASHRAE Technical Committee 4.1

Meetings

TC 4.1 Load Calculation Data and Procedures

Monday 2:15pm-4:15pm

Turin, Caesars

TC 4.1 Handbook Subcommittee

Sunday 3:00pm-4:00pm

(Consul Boardroom, Caesars)

TC 4.1 Research Subcommittee

Sunday 4:00pm-5:00pm

(Consul Boardroom, Caesars)

TC 4.1 Programs & Standards Subcommittees

Sunday 5:00pm-7:00pm

(Consul Boardroom, Caesars)

RP-1729 Project Monitoring Subcommittee

Radiant Cooling

Sunday 10:00am-11:00am

(Consul Boardroom, Caesars)

RP-1742 Project Monitoring Subcommittee

Updates to Measurements of Office Equipment Heat Gain Data

Sunday 11:00am-Noon

(Consul Boardroom, Caesars)

Seminar 11

The Current State-of-the-Art for Automated Pathway

From BIM Building Modeling Direct to HVAC

Heating/Cooling Load Calculations

Sunday 11:00am-12:30pm

(Caesars Palace, Las Vegas Floor: Augustus V/VI)

Seminar 21

Low Energy LED Lighting Heat Gain Distribution in Buildings

(ASHRAE RP-1681)

Monday 8:00am-9:30am

(Caesars Palace, Las Vegas Floor: Augustus I/II)



ASHRAE Technical Committee 4.1

Officers and voting members for 2016/2017:

✓ Robert Doeffinger	Chair	Voting
✓ Larry Sun	Vice Chair	Voting
✓ Suzanne LeViseur	Secretary	Voting
✓ Steve Bruning	Handbook Subcommittee Chair	Voting
✓ Glenn Friedman	Standards/Programs SubC Chair	Voting
✓ Rolando Legarreta	Research Subcommittee Chair	Voting
✓ Chris Wilkins		Voting
✓ Jeff Spitler		Voting
✓ Charles Barnaby		Voting
Jingjuan Feng		Voting
✓ Elyse Malherek		Voting

ed-a voting meet 9-7out

TC 4.1 Sign-In Sheet - Las Vegas

YEA	Name	Status	Affiliation	E-mail
1	Christian Bach	em visitor ✓	Oklahoma State Univ.	Cbach@Okstate.edu
2	Nicholas Harlow	visitor ✓	Halton Company	nicholas.harlow@halton.com
3	David Westberg	visitor ✓	SSAI	david.westberg@nasa.gov
4	Adam Williams	Visitor	Taylor Engineering	awilliams@taylor-engineering.com
5	Glenn Friedman	Voting Member	Taylor Engineering	gfriedman@taylor-engineering.com
6	Rachel Spitzer	Corresponding Member	Cyntergy	rspitzer@cyntergy.com
7	Jeff Spitzer	Member	Oklahoma State U.	spitzer@okstate.edu
8	ED SOWELL	VISITOR	RETIRED	ED_S1@EFSOWELL.US
9	Suzanne LeViseur	MEMBER	Haddad Engineering	slevisur@haddadeng.com
10	Steve Bruning	Member	Newcomb Boyd	sbruning@newcomb-loyd.com
11	Scott Hellenbrung	visitor	UPonor	scothellenbrung@uponor.com
12	Larry Sun	MEMBER	tkisc	lsun@tkisc.com
13	JIM REGUES	NON-VOTING	CARRIOTE CORP	James.F.Regues@ranner.uto.com
14	JEFF LANDRETH	VISITOR	TKISC	landreth@tkisc.com
15	Chris Wilkins	Member	CRB	chris.wilkins@cnusa.com
16	Chip Barabach	Member	Consultant	chipbarabach@gmail.com
17	Elise Mainer	VM	West Group	elysem@tugi.com
18	Beland Legarreta	Member	Alegro Engineering	rdlegar@alegro-engineering.com
19	ALAN GILLIBAND	visitor	BUILDZERO.ORG	agilliband@buildzero.org
20	STEPHEN COFF	CMVM	Carmel Software	scoff@carmelsoft.com
21	Dennis Wessel	Section Head	TAC	d.wessel49@gmail.com
22	Bob Doelinger	member	EMM, Inc	red@emm.com
23	Leslie Jonsson	guest	Mazzetti	lyonsson@mazzetti.com
24	Russell Taylor	CMVM	United Technologies	rtaylor@utc.com
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