



**1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400**

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 2.6 DATE August 4, 2016

TC/TG/MTG/TRG TITLE Sound and Vibration Control

DATE OF MEETING June 27, 2016 LOCATION St. Louis, Missouri

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Voting members: Joseph Bridger John Dunlap Robert Hassler Dan LaForgia Patrick Marks Erik Miller-Klein Raj Prime Kenneth Roy Jason Swan Corresponding members: Zvirimumwoyo Chinoda Curt Eichelberger Jim Kline Greg Meeuwsen Paul Meisel Alexander Michaud Andrew Mitchell Kim Osborn Karl Peterman Zhiping Wang Don Warick Steve Wise Randal Zimmerman		Voting members: Victor Clemente Matthew Murello Chris Papadimos Lauren Ronsse Michael Schwob Terence Tyson Corresponding members: Daniel Abbate Rami Alkhalil Jeffrey Babich Mark Bastasch Umberto Berardi Nathan Blum Jeffrey Boldt Norman Broner Todd Busch Peter Bushnell David Carroll Nicole Cuff Ashish Desai Martin Deveci Erroll Eaton Ronald Eligator Mark Fly Michael Froehlich		Visitors: Joe Brooks John Buck Franco Cincotti Matthew Hooti John Iacobellis Diane Jakobs Bryan Latshaw Zach Minear Greg Nortz Curtis Peters Karina Saenz-Acosta Richard Stauter Jack Stegall Philip Wentz

Provisional corresponding members: Nate Deibler Jeremy Stockmans		Corresponding members (continued): Kevin Gaghan Radha Ganesh Jason George Lewis Goodfriend Brian Guenther Ali Kemal Guney Arthur Hallstrom Ali Herfat Joseph Horesco Michael Keating Reginald Keith Manoj Khati Marvin Kloostra Will Kowald Kevin Lai Eddie Lau Robert Lilkendey Jerry Lilly Parag Maruthuria Charles Mattocks Dustin Meredith Gregory Miller Ahmed Mohamed Ralph Muehleisen Jose Nepomuceno Patrick Oliver John Pappas Richard Peppin James Pooler Michael Resetar Brian Reynolds Douglas Reynolds William Rockwood Erica Ryherd Benjamin Sachwald Asad Sardar Mark Schaffer Ken Shook Tim Simcoe Robert Simmons John Sofra Michael Spencer William Stewart		
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		Corresponding members (continued): Eric Sturm Nicholas Sylvestre-Williams Jack Wang Lily Wang Jonathan Weinstein Roman Wowk Jack Zybura Provisional corresponding members: Mark Long Mahmoud Mahmoud Jane Miller Ashish Tripathi John Wang		

DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*

TAC Section Head:	Bert Phillips
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	Pawel Wargocki Cyrus Nasser Michael Vaughn
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

ASHRAE TC 2.6 Sound and Vibration Control

Main Committee Meeting Agenda

2:15-4:15 PM Monday, June 27th 2016

Landmark 2– Marriott St Louis Grand – St Louis

NOTE: All Task Group Chairs and Subcommittee Chairs are asked to submit written report to the Secretary (Andrew Mitchell) before Friday July 15th 2016.

- 1. Call to order (LaForgia) [3 minutes]**
 - 1.1. Read scope of TC 2.6
 - 1.2. Read ASHRAE Code of Ethics statement: "The ASHRAE Code of Ethics is to be adhered to by those doing ASHRAE business whether or not they are an ASHRAE member (www.ashrae.org/about-code-of-ethics)."
 - 1.3. Additions and/or modifications to the agenda
- 2. Introduction of those present (LaForgia) [5 minutes]**
 - 2.1. Welcome new members and visitors
- 3. Confirmation of current voting members (Schwob/Mitchell) [3 minutes]**
- 4. Review and approval of the minutes (Mitchell) [3 minutes]**
 - 4.1. **Robert Hassler (1st), Joe Bridger (2nd), 9-0-0-6-CV**
- 5. Secretary's report (Mitchell) [3 minutes]**
 - 5.1. All Task Group Chairs and Subcommittee Chairs are asked to submit written report to Andrew Mitchell by Friday, July 15th 2016.
- 6. TC Chair's meeting report (LaForgia) [5 minutes]**
- 7. Chair's announcements and correspondence (LaForgia) [3 minutes]**
- 8. Subcommittee reports (written reports to be provided to Secretary)**
 - 8.1. Research Subcommittee (Eichelberger) [20 minutes]**
 - 8.1.1. Research Chair's meeting report
 - 8.1.1.1. Refer to attached subcommittee meeting minutes.
 - 8.1.2. Ongoing research projects
 - 8.1.2.1. RP-1408 The effect of lining length on the insertion loss of acoustical duct liner with PI Reynolds/UNLV (Lilly)
 - 8.1.2.2. RP-1529 Full frequency numerical modeling of sound transmission in and radiation from lined ducts PI Herrin/UK (Marks) – FINAL DISCUSSION
 - 8.1.3. Work Statements/RTAR's/URP's
 - 8.1.3.1. RTAR-1707 Annoyance Threshold of Tones in Noise as related to building services equipment (L. Wang)
 - 8.1.3.2. RTAR- 1754 Developing the standard test method for Dynamic Characteristic of Vibration Isolators (J. Wang)
 - 8.1.3.3. RTAR-*** Speech privacy in high performance buildings (Roy)
 - 8.1.4. Topics for future research
 - 8.2. Programs Subcommittee (Miller-Klein) [15 minutes]**
 - 8.2.1. Program Chair's meeting report
 - 8.2.2. Programs this meeting
 - 8.2.2.1. Hot topics this meeting
 - 8.2.3. Potential programs next meeting – Las Vegas NV
 - 8.2.3.1. Steve Wise asked whether there might be any fan people present that know of anything related to noise in the next few meetings. Joe Brooks commented that he did not know of any.
 - 8.2.3.2. Erik Miller-Klein suggested having one (1) scheduled outside speaker to be involved with subcommittee meetings for a hot topic type

session, which would provide some educational information and value to attendees (i.e. sound quality, vibration isolation materials, etc.).

8.3. **Publications Subcommittee** (Wise) [10 minutes]

8.3.1. Handbook chapters

8.3.1.1. Handbook Applications 2019 (Wise)

8.3.1.1.1. Update to duct attenuation section (incorporate RP1408/1529).
Joe Bridger, Pat Marks and Andrew Mitchell.

8.3.1.1.2. Confirm that all equations from the Algorithms text are included in the chapter.

8.3.1.1.3. Reformat of vibration sections.

8.3.1.2. Handbook Fundamentals 2017 (Wise)

8.3.1.2.1. Completed – nothing more to do here.

8.3.2. Other publications

8.3.2.1. Algorithms for HVAC Acoustics (Miller)

8.3.2.1.1. We are not enthusiastic about ASHRAE selling full software; undecided about sponsoring support files (i.e. dll, libraries, etc.).

8.3.2.1.2. Intent is to migrate relevant algorithms content that is currently missing in the Applications handbook, rather than updating the Algorithms for HVAC Acoustics publication.

8.3.2.2. Application of Manufacturers' Sound Data

8.3.2.2.1. The book needs significant update. Discussion in Publications subcommittee about discontinuing the book and integrating content into the Applications Handbook.

8.3.2.2.2. Motion to take no further action with updates to the Applications of Manufacturer's Sound Data publication.

8.3.2.2.3. **Jason Swan (1st), Patrick Marks (2nd), 9-0-0-6-CV**

8.3.3. Web page (Schwob)

8.3.3.1. Mike will be migrating the current TC 2.6 website to the official ASHRAE TC 2.6 website. Two (2) websites will persist to allow additional content (i.e. presentations, archives, etc.) to be stored on the current TC 2.6 site.

8.4. **Standards Subcommittee** (Clemente) [20 minutes]

8.4.1. SPC 130 – Method of Test for Rating Ducted Air Terminal Units (Zimmerman)

8.4.1.1. Been submitted for publication under public review.

8.4.2. SPC 189 – Design for High Performance Green Buildings (Miller-Klein)

8.4.2.1. Tuesday evening, (6/28), a clean draft will be presented to working group 8; if approved, it will go to full 189.1 committee on Wednesday (6/29). The document will go out for public comment if approved at the main meeting.

8.4.3. SPC 197 – Method of Test for Passive Vibration Isolators (J. Wang)

8.4.3.1. This committee has been suspended.

8.4.4. SPC 200 – Method of Test for Chilled Beams (Zimmerman)

8.4.4.1. SPC 200 was published last year, but reopened to address items discovered that were left out. Omissions were not related to acoustics.

8.4.5. Updates from Other Standards Organizations

8.4.5.1. AHRI (Abbate)

8.4.5.1.1. Updates to 260 and 261 are in progress.

- 8.4.5.1.2. AHRI in preliminary stages of starting a certification program for sound of air handling units (based on ASHRAE 200).
- 8.4.5.2. AMCA (Brooks)
 - 8.4.5.2.1. ASHRAE board expected to approve AMCA 210/ASHRAE 51 at this meeting.
 - 8.4.5.2.2. Working on standard AMCA 207, which is a method to determine electrical input power to fans.
 - 8.4.5.2.3. AMCA in final stages of developing certification program for single room air handlers including air and sound performance.
- 8.4.5.3. ANSI (Ali Herfat)
- 8.4.5.4. ASTM (Peppin); E33 (Lilly)
 - 8.4.5.4.1. Silencer round robin still in progress; waiting on one (1) lab to submit data for the test samples.
 - 8.4.5.4.2. Rewriting in progress for Standards E1130 (open plan) and E2638 (closed room) for speech privacy; expect to be balloted shortly.
- 8.4.5.5. ISO (Reynolds); ISO TC205/TC43.2 (Roy)
 - 8.4.5.5.1. Joint workgroup between TC205 and TC 43.2 for standard for built environment is inactive.
 - 8.4.5.5.2. Sound absorption standards 354 and 11654 are being revised.
- 8.5. **Standing Subcommittees** [10 minutes]
 - 8.5.1. Sound Criteria (Bridger)
 - 8.5.2. Vibration Isolation (M Hooti)
 - 8.5.2.1. Discussion related to transformer vibration isolation (currently no guidelines in chapter 48). Discussions related to issues with surge frequencies.
- 8.6. **Operations Subcommittee** (LaForgia) [15 minutes]
 - 8.6.1. Honors and awards (Miller-Klein)
 - 8.6.2. Long range planning (LaForgia)
 - 8.6.2.1. Changes to subcommittee chairs.
 - 8.6.2.1.1. Joe Bridger will be replacing Victor Clemente for the Standards subcommittee.
 - 8.6.2.1.2. Erik Miller-Klein will be replacing Lauren Ronsee for the Programs subcommittee.
 - 8.6.2.1.3. Matthew Hooti will be replacing Jack Wang for the Vibration Isolation subcommittee.
 - 8.6.2.1.4. Greg Meeuwsen taking over for Curt Eichelberger for the Research subcommittee.
 - 8.6.3. Membership (Schwob/LaForgia)
 - 8.6.3.1. Six (6) individuals rolling off as voting members as of this meeting.
 - 8.6.3.2. Adding four (4) people as voting members: Matthew Hooti, Jerry Lilly, Greg Meeuwsen, Steve Wise.
 - 8.6.4. Liaisons (Miller-Klein)
 - 8.6.4.1. ASHRAE TC 2.1 Physiology and Human Environment (L. Wang)
 - 8.6.4.1.1. Proposed research on speech privacy and circulated draft, asking for vote Tuesday (6/28).
 - 8.6.4.2. ASHRAE TC 2.7 Seismic and Wind Resistant Design (Peterman)
 - 8.6.4.2.1. No updates
 - 8.6.4.3. ASHRAE TC 5.1 Fan Design and Application (Osborn)
 - 8.6.4.3.1. RTAR for inlet/discharge effects.
 - 8.6.4.4. ASHRAE TC 5.2 Duct Design (Hassler)
 - 8.6.4.4.1. Duct Design Guide

- 8.6.4.4.2. Duct fitting database
 - 8.6.4.4.2.1. Duct fitting database will no longer be available on CD.
- 8.6.4.5. ASHRAE TC 5.3 Room Air Distribution (Zimmerman)
 - 8.6.4.5.1. AHRI 880/885 Air Terminals
 - 8.6.4.5.1.1. AHRI 880 recently had rating points added for exhaust boxes.
 - 8.6.4.5.1.2. AHRI 130 is going out for publication; manufacturers should begin getting performance data for exhaust boxes certified.
 - 8.6.4.5.2. AHRI 1240 Performance Rating of Chilled Beams
 - 8.6.4.5.2.1. Manufacturers should be entering into certified performance program for chilled beams with standard 200.
- 8.6.4.6. ASA (L. Wang)
 - 8.6.4.6.1. The next ASA conference will be November 28 through December 2 in Honolulu.
 - 8.6.4.6.2. Discussion related to public policy about wind turbines (challenged to write standard). Also, discussions related to noise in public accommodations (restaurants). Possibility of writing classifications (there will be a special session held in Boston in the spring dealing with noise in restaurants).
- 8.6.4.7. VISCMA (Peterman / Hooti)
 - 8.6.4.7.1. Papers being put up on the website on a regular basis addressing vibration isolation issues, seismic, etc. Visit the website for more information.
- 8.6.4.8. Others: CTI (Miller-Klein), INCE (Lilly), NCAC (Bridger), CIBSE (Swan), EGSA (Simmons), etc...
 - 8.6.4.8.1. CTI: movement on standard (ATC 128) related to the definition of sound power.
 - 8.6.4.8.2. The next NCAC conference will be held from September 16-18 in Chicago, IL.

9. New business/Old business [5 minutes]

- 9.1. Finalize Scope of Committee (LaForgia)

10. Next meeting date and location – Las Vegas NV – Jan 28th – Feb 1st 2017

11. Adjournment

- 11.1. Pat Marks (1st), Erik Miller-Klein (2nd)

Attendees:

Curtis Eichelberger	Jason Swan	Randy Zimmerman	Deborah Calloway
Steve Wise	Greg Meeuwsen	Brian Reynolds	Greg Nortz
Matthew Hooti	Eric Sturn	Phil Wentz	Patrick Marks
Dan LaForgia	Robert Simmons	Franco Cincotti	
Andrew Mitchell	Kirina Saenz	Kenneth Roy	
Erik Miller-Klein	Joe Bridger	Kim Osborn	

Highlights of Research Chair's meeting:

- Our research liaison is Pawel Wargocki (RL2@ashrae.net). Our Research Liaison (RL), should review all RTARs and WSs before submittal to RAC. Please copy Greg Meeuwsen, TC Research Chair (gmeeuwsen@trane.com) on all correspondence with the Research Liaison.
- All RTARs and WSs should have a clearly defined *Stage Funding* and *Project Milestones*. At the end of each phase there should be well defined deliverables and payments (based on % of total project cost), so that the PMS can assess the feasibility of the next phase and contractor's ability to complete the remainder of the project.
- Co-sponsoring TC's need to participate in the RTAR and WS preparation.
- For RTARs and WSs that are conditionally accepted, provide a cover letter addressing each comment.
- RAC meets minimum of 3 meetings on March 15, August 15 and December 15. WS and RTARS should be reviewed by the Research Chair and Research Liaison, and submitted to RAC at least one month before these deadlines.

Ongoing Research Projects:

RP-1408 The effect of lining length on the insertion loss of acoustical duct liner. Jerry Lilly PMS chair. Dr. Doug Reynolds, UNLV, principle investigator. The objective of this research is to determine how the sound attenuation of lined ducts depends on duct length. With the help of Price Industries, over 200 tests on round and rectangular straight ducts have been completed. A draft report was submitted and is currently being reviewed by the PMS.

TC recommended a no-cost extension to July 31, 2016, during the Orlando meeting. This is the target completion date for the final report. Remaining deliverable is a Technical Paper.

RP-1529 Full frequency numerical modeling of sound transmission in and radiation from lined ducts – Pat Marks, PMS Chair. Dr. David Herrin, University of Kentucky, principle investigator. This project developed and validated full-frequency numerical modeling techniques for sound transmission through, and radiation from, HVAC ductwork. The project is complete and a final report is on the web site.

Erik Miller-Klein, Joe Bridger and Pat Marks to prepare a follow up RTAR to fill gaps in the Handbook. Greg Meeuwsen to also look into a research Grant in Aid to accomplish the same objective?

Work Statements/RTARs:

RTAR-1754 - Developing the standard test method for dynamic characteristics of vibration isolators. Jack Wang and Jerry Lilly wrote and submitted an RTAR. RAC conditionally approved the RTAR with mandatory changes. Curt Eichelberger updated the RTAR and forwarded to Karl Peterman, Greg Meeuwsen, Don Warick, Jr. and Mathew Hooti for review and comment. Next step is to get RL approval and then we will follow with TC vote on the updated RTAR. Curt Eichelberger has a draft WS in process.

WS-1707 Annoyance thresholds of tones in noise as related to building services equipment. Lily Wang championed this RTAR. TC 2.6 unanimously voted to approve the WS, and TC 2.1 unanimously voted to co-sponsor the WS at the Atlanta meeting. RAC returned the WS with comments. Steve Wise and Jason Swan agreed to champion this project moving forward. The WS must be approved and out for bid by July 1, 2017, or topic will be dropped by RAC.

Speech privacy in high performance buildings – Ken Roy prepared a RTAR and reviewed with members at the Research Subcommittee at the June 2015 meeting. Next steps is to forward the draft to TC 2.6 and TC2.1 members for review and email vote. Joe Bridger volunteered to champion this RTAR moving forward. Looking for email TC 2.6 vote.

Sound attenuation of underfloor air systems – TC 5.3, Air Distribution, requested that TC 2.6 co-sponsor a project relating to a methodology to predict sound levels in the occupied space from UFAD equipment and ductwork. TC 5.3 champion is Chris Buroughs. TC 2.6 member Randy Zimmerman will coordinate with TC 5.3.

Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement for Air and Sound Performance. --TC 5.1 is preparing an RTAR on Kim Osborn volunteered to be our liaison with TC 5.1.

Topics discussed and prioritized for future research:

The top topics discussed during the research subcommittee meetings are listed below in order of priority.

1. **Room effect** (10 votes) – Revisit and provide more clarity on how to calculate the room effect in the Handbook. This would include the effect of single pass ceiling systems and ceiling plenum. Joe Bridger agreed to champion this topic and prepare an RTAR, along with Ken Roy and Erik Miller-Klein. This task should start with a good literature review.
2. **Plumbing noise** (8 votes) (defined in terms of flow and pressure drop) – PEX piping. Relationship between air-borne and structure-borne. Canadian data, ISO Standards? Champion Erik Miller-Klein, Jerry, Chris Papadimos.
3. **Fluctuation criteria** (6 votes) – Objective would be to develop a metric for Criteria section of Handbook. Criteria subcommittee decided to work on tone criteria first.
4. **Dynamic properties of building floor/ceiling constructions** (5 votes) – Need Champion.
5. **Noise intrusion from outside or adjacent interior spaces** (3 votes) – Champion: Erik Miller-Klein.
6. **“Non-fibrous” duct liners** (3 votes) – Application related, not product ratings. No champion for this topic at this time.
7. **Flow noise generation in ducts, fittings, louvers and dampers** (2 votes) – Looking for a champion for this topic. We need a volunteer to do a literature review, as some of this information may already be published.
8. **Criteria** (2 votes) – What is the basis for values that were chosen for room use. Need evidence based, rather than accepted design practice.

ASHRAE TC 2.6 Programs Subcommittee Meeting Agenda

Meeting Date: June 26, 2016

Programs Subcommittee Meeting Overview:

- Plan TC 2.6 program submissions for next two meetings
 - Las Vegas 2017 (January 28 – February 1, 2017)
 - Long Beach, CA 2017 (June 24 – 28, 2017)
- Discuss tentative TC 2.6 program ideas for future meetings
 - Chicago 2018 (January 20 – 24, 2018)
 - Houston 2018 (June 23 – 27, 2018)

Definitions:

- Technical Papers
 - Submitted directly by author
 - More involved papers usually detailing research or similar activities
 - Maximum of 30 pages
 - Rigorous double-blind review process; subject to commercialism review
 - Longer timeline for development and approval
 - Published in *Transactions*
- Conference Papers
 - Submitted directly by author
 - Less rigorous than technical papers
 - May highlight case studies or ongoing research
 - Maximum of 8 pages
 - Single blind review process; subject to commercialism review
 - Shorter timeline for development and approval
- Seminars/Workshops/Forums
 - Session chairs and speakers selected by TCs
 - Program submitted by session chair
 - Submissions must include selected speakers, bios, abstract, learning objectives, Q&A
 - Speakers must submit presentations 1 month prior to meeting for commercialism review
 - Seminars
 - 60 minutes: 1 – 2 presentations
 - 90 minutes: 3 – 4 presentations
 - Workshops (new in Summer 2014)
 - One chair and two presenters (maximum)
 - 60-minute length only: 30 minutes for presentations + 30 minutes for discussion
 - Forums
 - One moderator
 - 60-minute length only: no presentations

Upcoming Conference Program Tracks:

Las Vegas 2017 (January 28 – February 1, 2017)

Deadlines:

March 14, 2016 – Conference Paper Abstracts Due

April 18, 2016 – Technical Papers Due

June 6, 2016 – Conference Papers Due

August 8, 2016 – Seminar, Forum, and Workshop Proposals Due

Track 1 Fundamentals and Applications

Track 2 HVAC&R Systems and Equipment

Track 3 Water-Energy Nexus

Track 4 Commercial and Industrial IAQ

Track 5 Mission Critical Design and Operation

Track 6 Effects of Climate Change on HVAC&R

Track 7 Energy Efficient Industrial Buildings

Track 8 Building Operation and Maintenance

Long Beach 2017 (June 24 – 28, 2017)

Deadlines:

August 29, 2016 – Conference Paper Abstracts Due

August 29, 2016 – Technical Papers Due

December 9, 2016 – Conference Papers Due

February 6, 2017 – Seminar, Forum, and Workshop Proposals Due

Track 1 Fundamentals and Applications

Track 2 HVAC&R Systems and Equipment

Track 3 Refrigeration

Track 4 Building Life Safety Systems

Track 5 Controls: Smart Building Systems and the Security Concerns as Technology Emerges

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

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

Track 8 Residential Buildings: Standards Guidelines and Codes

Track 9 Research Summit

Program Topics: Las Vegas 2017 (January 28 – February 1, 2017)

August 8, 2016 – Seminar, Forum, and Workshop Proposals Due

Conference	Subject	Type	Status	Session Organizer
Las Vegas 2017	Track 1 Fundamentals and Applications Track 2 HVAC&R Systems and Equipment Track 3 Water-Energy Nexus Track 4 Commercial and Industrial IAQ Track 5 Mission Critical Design and Operation			

	Track 6 Effects of Climate Change on HVAC&R Track 7 Energy Efficient Industrial Buildings Track 8 Building Operation and Maintenance			
Las Vegas 2017	Track 2 HVAC&R Systems and Equipment Session Topic: Quieting Air Distribution Systems <ul style="list-style-type: none"> ASHRAE Standard 200 on method of test for chilled beams (Peterman) Terminal units above and below the occupied space (Zimmerman) Fan-powered boxes under UFAD systems (Zimmerman) 	Seminar	To be submitted	Karl Peterman
Las Vegas 2017	Track 1 Fundamentals and Applications Session Topic: Correlating measured vs. predicted noise in mechanical systems <ul style="list-style-type: none"> Noise prediction software overview Measurement noise process in laboratories Applications of Manufacturers' Sound Data Case study of measured vs. predicted noise in a project 	Seminar	To be submitted	Chris Papadimos
Las Vegas 2017	Track 5 Mission Critical Design and Operation Generators – Vibration Isolation, Property Line Noise			Dan Laforgia
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Program Topics: Long Beach 2017 (June 24 – 28, 2017)

February 6, 2017 – Seminar, Forum, and Workshop Proposals Due

Conference	Subject	Type	Status	Session Organizer
Long Beach 2017	Track 1 Fundamentals and Applications Track 2 HVAC&R Systems and Equipment Track 3 Refrigeration Track 4 Building Life Safety Systems Track 5 Controls: Smart Building Systems and the Security Concerns as Technology Emerges Track 6 Commissioning: Optimizing New and Existing Buildings and their Operation Track 7 Net Zero Energy Buildings: The International Race to 2030			

	Track 8 Residential Buildings: Standards Guidelines and Codes Track 9 Research Summit			
Long Beach 2017	Track 7 Net Zero Energy Buildings: The International Race to 2030 Challenges & Opportunities 189.1			
Long Beach 2017	Track 6 Commissioning: Optimizing New and Existing Buildings and their Operation ASHRAE PMP Best Practices 189.1			
Long Beach 2017	Track 8 Residential Buildings: Standards Guidelines and Codes Multi-family: IBC, ICC G2-Guidelines, HUD 189.1 ISO Noise Rating Buildings (19488)			
Long Beach 2017	Technical Paper Session (no specific track) (August 29 th , 2016 Submission deadline)	Technical Paper Session	After RP approved	Doug Reynolds

Hot Topic – Subcommittee Presentation

Invite outside special topic speaker to meetings, listed in the ASHRAE schedule and available to both TC 2.6 and larger organization.

- Speakers can be video-conferenced for this special session

Future

- Elevator Noise Control (Lilly)
- Electrical Noise: transformers, electrical motors (Papadimos)
- Sound attenuators and acoustical louvers (how they actually perform vs. how they are designed to perform) (Papadimos)
- Discussion of Classroom Acoustics Standard ANSI S12.60 that has been adopted by the ICC as code (Bridger)

Other Notes

- Session organizer should focus on content of abstracts (especially the abstract for the session) to make sure abstracts are good. Track chairs look at abstracts to determine if session will be accepted or not.

- Session organizers should compile all information for submitted sessions in word document, so that the sessions can be easily resubmitted for future conferences if session is rejected.
- It is now mandatory for speakers to use an ASHRAE-developed template for all presentations at meetings (choices of templates are available on ASHRAE website).

Reference Information: Track Descriptions

Las Vegas 2017 (January 28 – February 1, 2017)

Deadlines:

March 14, 2016 – Conference Paper Abstracts Due

April 18, 2016 – Technical Papers Due

June 6, 2016 – Conference Papers Due

August 8, 2016 – Seminar, Forum, and Workshop Proposals Due

- **Track 1: Fundamentals and Applications**

Track Chair: [Chuck Curlin](#)

Email: ccurlin@shultzeg.com

Engineering fundamentals are the foundation to understanding modeling, design, construction and operation of HVAC&R applications. This track provides opportunities for papers and presentations on theories, models, designs and shared experiences for both theoretical and applied concepts.

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

Track Chair: [Michael Collarin](#)

Email: Michael.Collarin@parsons.com

Selection of equipment and design of systems is critical for effective HVAC&R operation, and for achieving building operators' goals. The papers and programs in this track will assist designers and building operators in the use of traditional, non-traditional and hybrid equipment and systems; with an emphasis on high performance, sustainable and LEED-certified buildings.

- **Track 3: Water-Energy Nexus**

Track Chair: [Gary C. Debes](#)

Email: gcdebes@verizon.net

The interdependencies between our water and energy systems are clear and are becoming more prominent as development requires the use of more resources while over-use and climate change make some resources scarcer. On the macro level, water is used in all phases of energy production and electricity generation (including renewables); and energy is required to extract, convey and deliver water, and to treat wastewaters prior to their return to the environment. On the micro level, the water-energy nexus is a major consideration for the HVAC&R community in determining equipment and system selection and design as well as building operation. This track will present papers and programs highlighting recent research on this issue as well as technologies and designs intended to reduce the gap between energy and water efficiency.

- **Track 4: Commercial and Industrial IAQ**

Track Chair: [Kevin Marple](#)

Email: kmarple@benzco.com

Indoor Air Quality is a vital consideration in the built environment. As people spend increasingly more time in industrial and commercial facilities, IAQ is closely linked to occupant comfort, satisfaction, productivity and health. This track will offer papers and programs to inform building owners and operators on the value of improving IAQ.

- **Track 5: Mission Critical Design and Operation**

Track Chair: Carrie Anne Crawford

Email: carriecrawford@eeace.com

As societies become more dependent on mission critical facilities, the design and operation of these facilities has undergone rapid change. This track will present papers and programs which will highlight advances in technologies, controls, design and operation of mission critical facilities to meet their increasing loads while also minimizing their impact on energy/water usage.

- **Track 6: Effects of Climate Change on HVAC&R**

Track Chair: Rocky Alazazi

Email: mrалazazi@yahoo.com

Climate change will have an increasing effect on the design and operation of the built environment. How does the HVAC&R community design for buildings today that are intended to be highly functional and efficient well into a future where today's standards, codes and practices may not be sufficient to meet tomorrow's climatic conditions? This track seeks papers and programs that will inform the selection of strategies, designs and approaches that will increase building resilience and facilitate climate adaptation.

- **Track 7: Energy Efficient Industrial Buildings**

Track Chair: Corey Metzger

Email: corey.metzger@resourcece.com

Industrial facilities often have different HVAC&R requirements than do commercial and institutional facilities. Oftentimes these are a result of the processes that occur within industrial facilities as well as the life safety issues these processes create. This track will present papers and programs that will inform how energy efficiency can be achieved without compromising life safety considerations.

- **Track 8: Building Operation and Performance**

Track Chair: Cynthia Moreno

Email: cindym@tmmechanical.com

Modeling has become an essential factor in the design of all aspects of many buildings. Often the operational results of the building do not match the modeled outcome that the owner/operator expected. This can lead to much "finger pointing" or worse. This track will present papers and programs to update modelers, designers, contractors and owners/operators on how to better match building

Long Beach 2017 (June 24 – 28, 2017)

Deadlines:

August 29, 2016 – Conference Paper Abstracts Due

August 29, 2016 – Technical Papers Due

December 9, 2016 – Conference Papers Due

February 6, 2017 – Seminar, Forum, and Workshop Proposals Due

- **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**

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. This track seeks papers and programs that address the wide range of applications of refrigerants and their improvements, including 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: Smart Building Systems and the Security Concerns as Technology Emerges**

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 these technologies advance and buildings become “smarter,” the question is asked ... “Is my building in threat of a cyber attack?” As owners and designers incorporate more controls system 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 programs within this track will explore 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

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.

Conference Program Chair: Ann Peratt

Email: ann.peratt@gmail.com

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25	Brian Reynolds	breynolds@trane.com
26	Joe Bridger	joe@sacnc.com
27		

To: Dan LaForgia
 From: Steve Wise
 Date: June 27, 2016
 Subject: TC2.6 Publications Subcommittee Minutes – St. Louis, June 2016

Attendees:

Joe Bridger
 Dan LaForgia
 Erik Miller-Klein
 Ken Roy
 Jason Swan
 Franco Cincotti
 (voting members in red)

Curt Eichelberger
 Mark Fly
 Matthew Hooti
 Giovanni Iacobellis
 Pat Marks
 Greg Meeuwsen
 Andrew Mitchell

Kim Osborne
 Jennifer Nelson
 Brian Reynolds
 Michelle Patrick
 Karina Saenz
 Robert Simmons
 Jeremy Stockmans

Jason Swan
 Eric Sturm
 Don Warick
 Randy Zimmerman

Fundamentals Handbook, 2017 revision

See you next year.

Application of Manufacturer Sound Data Guide

We spent a lot of volunteer effort to get a handle on the scope of work required to update this book that has been available for 20 years. Turns out, several chapters require substantial rewrite.

Sales to date of these books to date are: **1593 copies**, which seemingly does not justify the extended effort that would be required beyond just updating the references. So, we decided to just let it die and roll any good info into the handbook if not already there.

Website

Mike Schowb did not attend, but we think that the website is in good shape. Note that ASHRAE has a parallel website: <https://tc0206.ashraetcs.org/> but it is not always up to date and may have some link issues. Ours is <http://ashrae-tc26.org/>

Algorithms

Greg Miller led a discussion in a separate “Hot Topic” session.

Conclusions include:

- *We are not enthusiastic toward ASHRAE selling full software, but we are undecided about possibly sponsoring support files (dll).
- *Rather than updating the 1991 publication describing the algorithms, we should just get it all into the Handbook.

Applications Handbook

There is a new update procedure for print version – All TC members have access on-line to make edits. Interesting.....

We are going to perform an ON-LINE VERSION REFORMAT (Pat Marks gave encouraging statistics on viewership for this chapter!)

- *A desirable on-line format will probably have a different view-screen aspect ratio than the portrait/letter/2-column configuration of the print version. We may embed audio files, spreadsheets, etc. and have click-by-click convenience.
- *Will ASHRAE support the concept? TBD

ACTION: Wise to distribute “working parts” to the volunteers below.

We hope to have something to show in Las Vegas.....

UPDATE DUCT ATTENUATION SECTION	CONFIRM THAT ALL ALGORITHM EQUATIONS ARE INCLUDED	RE-FORMAT VIBRATION SECTION
(Incorporate results from RP 1408 /1529)		(and confirm answer to SCREW CHILLER inquiry)
Joe Bridger	Steve Wise	Matthew Hooti
Pat Marks	Jason Swan	Eric Sturm
		Erik Miller-Klein
Reggie Keith, Mike Schwob, Trevor Caldwell, Ahmed Alaa Eldin Mohamed, Ashish Tripath ??		Karina Saenz
		Don Warick
		Robert Simmons

1. Transformer Vibration Isolation Steve Wise and Matthew Hooti

Work with Steve Wise and Chris Papadimos to present more case studies on transformer vibration isolation. Physical dimensions on Elastomeric Pads base on the size and weight and application of airbags base on the frequencies

Currently transformers are not included in chapter 48. A line should be added to the table to include transformers.

2. Discuss the Inquiry from Stephen W. Duda, ASHRAE Fellow, on a major screw chiller equipment manufacturer recommending against spring isolators on screw chillers – which is a direct contradiction of the advice given on Page 48.45 of the 2015 ASHRAE Handbook. Leaders: Steve Wise and Matthew Hooti

Chapter 47 should be revised. There have been many issues with surge frequencies on screw chillers. The line for screw chillers on the table should be greyed out and a note should indicate" Refer to surge frequencies" on the foot note.

Curt Eichelberger also brought up issues with stack fans on packaged equipment, where fans rotate above 2900 rpm.

3. Discuss an example and general template to rewrite the vibration isolation selection based on type of equipment – Table 47 of Chapter 48 in ASHRAE Handbook. Leaders: Michael Schwob, Reginald Keith, Steve Wise,

Steve Wise presented the new general format on equipment vibration isolation. Matthew Hooti Volunteered to work with Steve Wise on this topic

4. WS1754: "Developing the Standard Test Method for Dynamic Characteristics of Vibration Isolators". Leader Curt

Jack Wong and Jerry Lilly worked on the RTAR and it has been conditionally approved by RAC. Curt Eichelberger updated the RTAR to meet RAC conditions. Greg Meeuwsen reviewed updated RTAR and he believed it is good. Karl Peterman and Don Warick, Jr. volunteered to review updated RTAR.

Deadline on submission of revised RTAR and Wok Statement is December 2016. End of July is the deadline on RATR and W.S. review; once reviewed they should be approved unanimously by all TC2.6 voting members before submission to RAC.