ASHRAE TC 2.6 Sound and Vibration Control
Main Committee Meeting Agenda
2:15-4:15 PM Monday, January 22, 2018
Palmer House Hilton – Water Tower, Chicago, IL
NOTE: **All Task Group Chairs and Subcommittee Chairs are asked to submit written report to the Secretary (Karina Saenz-Acosta) before Friday February 2nd, 2018**

1. **Call to order** (Miller-Klein) [3 minutes]
   - 1.1. Read scope of TC 2.6: TC 2.6 is concerned with the fundamental scientific and engineering principles of sound and vibration, particularly as applied to the design and performance of the built environment.
   - 1.2. 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** (Miller-Klein) [5 minutes]
   - 2.1. Welcome new members and visitors

3. **Confirmation of current voting members** (Wowk) [3 minutes]
   - 3.1. 7 members

4. **Review and approval of the minutes** (Saenz-Acosta) [3 minutes]
   - 4.1. **Joseph Bridger (1st), Jason Swan (2nd), 7-0-0-CV**

5. **Secretary's report** (Saenz-Acosta) [3 minutes]

6. **TC Chair's meeting report** (Miller-Klein) [5 minutes]
   - 6.1. New online Roster changes, if you are not a member of TC 2.6 please go to our website: https://tc0206.ashraetcs.org/membership.php
   - 6.2. 125th Anniversary Conference papers

7. **Chair's announcements and correspondence** (Miller-Klein) [3 minutes]

8. **Subcommittee reports (written reports to be provided to Secretary)**
   - 8.1. **Research Subcommittee** (Meeuwsen) [20 minutes]
     - 8.1.1. Research Chair's meeting report
     - 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) – Final drafts submitted
         - 8.1.2.1.1. J. Lilly indicated that PMS voted 8-4-1
         - 8.1.2.1.2. **Motion to accept the final report, Joseph Bridger (1st), Patrick Marks (2nd), 7-0-0-CV**
     - 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 (J. Swan)
       - 8.1.3.2. RTAR- 1754 Developing the standard test method for Dynamic Characteristic of Vibration Isolators (R. Wowk)
       - 8.1.3.3. RTAR xxxx Speech privacy in high performance buildings (Miller-Klein) – liaisons from other committees must be present
         - 8.1.3.3.1. Pending Vote Count from TC 2.1

8.1.3.4. RTAR 1829 Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement (Fan Arrays) for Air and Sound Performance Co-Sponsor with TC 5.1 (K. Osborn)
8.1.3.5. RTAR xxxx Procedure for estimating occupied space sound levels in the application of UFAD air terminals and air outlets.
8.1.4. Topics for future research

8.2. **Programs Subcommittee** (Miller-Klein) [15 minutes]
8.2.1. Program Chair's meeting report
8.2.1.1. Looking for a new Programs Subcommittee Chair
8.2.2. Programs this meeting
8.2.2.1. Hot topics this meeting
8.2.2.1.1. LNG facilities (R. Keith)
8.2.2.1.2. User's Manual 189.1 next steps (E. Miller-Klein)
8.2.2.1.3. Looking for new topics and to have one or two one hour hot topics at future conferences during subcommittee time
8.2.3. Potential programs next meeting – Houston 2018
8.2.3.1. Track 4: Safeguarding your HVAC&R System: Generators / Seismic + Vibration Isolation / OSHPD (co-sponsor: TC 2.7)

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. Deadline for next print edition is March 21st, 2018 (bring to TC e-vote by March 15th)
8.3.1.1.2. Expand vibration isolation Table 47 to include transformers and fan arrays. Direct drive plenum fans and VFDs were added to the list
8.3.1.1.3. The online version will have around 30 graphics linked to each line up that will include all the notes and cautions
8.3.1.1.4. For the print edition, add a note in Table 47 to go online for extended info
8.3.1.1.5. Incorporate revisions to duct liner attenuation tables (J. Lilly)
8.3.1.2. Handbook Fundamentals 2017 (Wise)
8.3.1.2.1. Still great
8.3.2. Other publications
8.3.2.1. Practical Guide to Sound & Vibration Control
8.3.2.1.1. Confirm that units are correct
8.3.2.2. Application of Manufacturers' Sound Data
8.3.2.2.1. TC 2.6 voted 9-0-0 a year ago to let this book go
8.3.2.2.2. All important info from this book will be incorporated into the online edition
8.3.3. Web page (Saenz-Acosta)

8.4. **Standards Subcommittee** (Bridger) [20 minutes]
8.4.1. SPC 130 – Method of Test for Rating Ducted Air Terminal Units (Zimmerman)
8.4.1.1. It is published
8.4.2. SPC 189.1 – Design for High Performance Green Buildings (Miller-Klein)
8.4.2.1. It has been approved by main committee
8.4.2.2. Updates will be published soon
8.4.2.3. On the process of writing the user's manual

8.4.3. SPC 200 – Method of Test for Chilled Beams (Bulookbashi)

8.4.3.1. The SPC 200 met on January 22, 2018 to review the draft 2018 version of standard 200. The SPC 200 will be soon balloted for final approval of the 2018 Edition for publication. After the 2018 Edition of ASHRAE 200 is published, the SPC will become a Standing Standard Project Committee (SSPC) and will be recruiting members to join this committee

8.4.4. Updates from Other Standards Organizations

8.4.4.1. AHRI (Bulookbashi)

8.4.4.1.1. AHRI Standards 260 (I-P) and 261 (SI)-2017, *Sound Rating of Ducted Air Moving and Conditioning Equipment.* The 2012 Edition of these standards have been updated to reference ANSI/AHRI Standard 230 sound intensity procedure for sound power determination and to include a method to predict sound ratings for untested fan operating points and unit sizes with certain restrictions

8.4.4.1.2. AHRI Standard 575-2017, *Method of Measuring Machinery Sound Within an Equipment Space.* Several sections of the 2008 Edition of this standard have been updated to remove the pure tones effect on the measured values and to reduce ambiguity

8.4.4.2. AMCA (Brooks)

8.4.4.2.1. AMCA 300 and AMCA 320 will be reviewed this year

8.4.4.3. ANSI (Lilly)

8.4.4.3.1. A program to measure ambient noise in rooms is becoming an ANSI standard

8.4.4.3.2. Drafting a new standard for physical education classroom including gymnasiums

8.4.4.4. ASTM E33 (Lilly)

8.4.4.4.1. A round robin test of duct silencers has been completed. All data is now being analyzed

8.4.4.5. ASTM

8.4.4.5.1. Focusing on do round robins to improve the standard precision by statement of all standards

8.4.4.6. ISO (Swan);

8.4.4.6.1. The TC205/43 joint venture project is being handled by working group WG27 led by Cyrille Demanet of Etex Group. It is called NWIP 18484: Building environmental design - Indoor environment - Design process for acoustic environment

8.4.4.6.2. The classification standard for residential buildings is designated working group WG29 and is led by Birgit Rasmussen of Aalburg University in Denmark called ISO/DIS 19488: Acoustics — Acoustic classification of dwellings

8.5. **Standing Subcommittees** [10 minutes]

8.5.1. Vibration Isolation (M Hooti)

8.5.1.1. Came up with a format for the online version of the Vibration Isolation Table, which would be more user friendly and can be updated annually

8.5.1.2. Roman presented a case study on issues with installations on site and interference between vibration isolation and seismic restraint

8.6. **Operations Subcommittee** (Miller-Klein) [15 minutes]
- 8.6.1. Honors and awards (Miller-Klein)
- 8.6.2. Long range planning (Miller-Klein)
  - 8.6.2.1. One hour once a month teleconference starting on March for guests and members
- 8.6.3. Membership (Miller-Klein)
  - 8.6.3.1. Good attendance
- 8.6.4. Liaisons (Miller-Klein)
  - 8.6.4.1. ASHRAE TC 2.1 Physiology and Human Environment (Eichelberger)
    - 8.6.4.1.1. Research project on effect of ventilation on sleeping environments and updating the handbook
  - 8.6.4.2. ASHRAE TC 2.7 Seismic and Wind Resistant Design (Marks)
    - 8.6.4.2.1. Name and scope of committee was changed
  - 8.6.4.3. ASHRAE TC 5.1 Fan Design and Application (Osborn)
    - 8.6.4.3.1. FBI Seminar this morning
    - 8.6.4.3.2. Project 1829 is moving forward
  - 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
    - 8.6.4.4.3. Duct leakage
  - 8.6.4.5. ASHRAE TC 5.3 Room Air Distribution (Zimmerman)
    - 8.6.4.5.1. AHRI 880/885 Air Terminals (Bulookbashi)
      - 8.6.4.5.1.1. AHRI 880 was published last month
      - 8.6.4.5.1.2. AHRI 885 is in the process of forming a subcommittee
  - 8.6.4.6. ASA (L. Wang)
    - 8.6.4.6.1. Next meeting in Minneapolis
  - 8.6.4.7. VISCMA (Peterman)
    - 8.6.4.7.1. Possibly making a Wikipedia page to get more visibility of the organization
  - 8.6.4.8. Others: CTI (Miller-Klein), INCE (Herrin), NCAC (Bridger), EGSA (Simmons), etc...
    - 8.6.4.8.1. INCE: Several sessions for HVAC for next meeting
    - 8.6.4.8.2. NCAC: next meeting in Nov 3rd

9. New business/Old business [5 minutes]
- 9.1. ASHRAE Learning Institute Course – due for major update

10. Next meeting date and location – Houston June 23 – 24, 2018

11. Adjournment

Joseph Bridger (1st), Patrick Marks (2nd)

4 YEA members

ASHRAE TC2.6 Research Subcommittee Report, 01/22/2018, Chicago, IL.
Greg Meeuwsen

Attendees:

Approximately 20 people

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.
- 2 RTARs considered by RAC, 2 accepted with comments.
- 2 work statements considered by RAC, 2 returned.
- There will be a new emphasis on submitting the research disposition form when research is completed.

  Considering penalties if no submission after three reminders
- The firsts PMS chair training module was conducted, it will be done again in the spring.
- A fourth review period has been added for RTAR's and WS'es, due dates for submission to RAC are now March 15, May 15, August 15, and December 15.

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 final report is approved by the PMS and submitted to ASHRAE. Was approved by TC today. Jerry and Jason Swan are drafting new duct lining tables for the handbook, to meet March deadline.

Work Statements/RTARs:

RTAR-1754 - Developing the standard test method for dynamic characteristics of vibration isolators. RTAR is approved by RAC. WS was circulated to voting members and RAC liaison, there are some concerns. Roman Wowk has agreed to take this on as principal author.

WS-1707 Annoyance thresholds of tones in noise as related to building services equipment. This is now at the RFP stage. RAC approved for funding here, final vote by end of the week. Fully expect this will be released for bid in next few months. Finalized contacts. Technical contact – Jason Swan. PES chair – Kim Osborne. PES members – Jason Swan, Greg Meeuwsen, Jerry Lilly, Steve Wise, Curt Eichelberger (representing TC 2.1).

Speech privacy in high performance buildings – Erik Miller-Klein has made minor revisions to the RTAR prepared by Ken Roy. It was voted by e-mail in July, result 10-0-0-10. Erik needs final vote from co-sponsor TC2.1. Erik will submit to RAC Liaison this week, to RAC by March deadline.

RTAR-1829 - Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement for Air and Sound Performance. –Main sponsor TC 5.1, RTAR is approved, WS development is starting. Kim Osborn is our representative with TC 5.1.

Procedure for Estimating Occupied Space Sound Levels in the Application of UFAD Air Terminals and Air Outlets. We will co-sponsor and develop RTAR with TC 5.3, Greg meeting with Chris Boroughs tomorrow.

ASHRAE TC 2.6 Programs Subcommittee Meeting Minutes

Meeting Date: January 21, 2018

Programs Subcommittee Meeting Overview:

- Plan TC 2.6 program submissions for next meeting
  - Houston 2018 (June 23 – 27, 2018)
- Discuss tentative TC 2.6 program ideas for future meetings
  - Atlanta 2019 (January 12 – 16, 2019)
  - Kansas City, MO 2019 (June 22 – 26, 2019)

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*
  - Due Completed 1 month after conference for review and presentation, for conference 1 year from current conference.
    - Example: March 2018 for January 2019 Conference
- 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
  - Abstract Due 1 month after conference, approval/rejection within 1 month, full paper due in 6 months, for conference 1 year from current conference.
- 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:

Houston 2018 (June 23-27, 2018)

Deadlines:
January 10 – Website Opens for Seminar, Workshop, Forum, Debate and Panel Proposals
February 9 – Seminar, Forum, Workshop, Debate and Panel Proposals Due

Tracks
Track 1: HVAC&R Systems and Equipment
Track 2: Fundamentals and Applications
Track 3: District Energy and Cogeneration Plants
Track 4: Safeguarding your HVAC&R System
Track 5: Residential - Modern Buildings in Hot and Humid Climates
Track 6: Professional Skills
Track 7: Research Summit
Track 8: HVAC&R Control Freaks
Track 9: HVAC&R Analytics

Proposed Programs
Track 4: Safeguarding your HVAC&R System
With TC 2.7

- Generator Noise Control (LaForgia)
- Vibration Control of HVAC&R Systems that Require Seismic, Wind or Thermal Restraint (Wowk)
- Seismic Source International (Carlson) – TC2.7

Program Topics

February 10, 2017 – Seminar, Forum, and Workshop Proposals Due

Conference	Subject	Type	Status	Session Organizer
Chicago 2018	**Track 3 Standards, Guidelines, and Codes** Human Centric Design for Acoustics	Conference Paper	Erik M-K	-
Chicago 2018	**Track 3 Standards, Guidelines, and Codes** ASHRAE 189.1 – Acoustics ASHRAE 189.1 Acoustics User's Manual Related Codes, Standards & Guidelines (*Depending on 189.1 Vote*)	Seminar	Erik Miller-Klein Michael Schmeida Joe Bridger	Erik Miller-Klein
Houston 2018	**Track 4: Safeguarding your HVAC&R**	Seminar	Dan LaForgia Roman Wowk James Carlson	Erik Miller-Klein
Atlanta 2019	**Track 2: Fundamentals & Applications** • Plumbing Noise & Vibration o American Society of Plumbing Engineers, TC 6.1 or 6.6 o Manufacturer: Hubbard Holdrite o Plumbing Engineer, reference from Jim Tauby, Curt Eichelberger, etc?			
Atlanta 2019	**Up for discussion at monthly TC 2.6 meeting (April or May)**			

Winter 2019

Track 2: Fundamental and Applications

- Plumbing Noise & Vibration
  - American Society of Plumbing Engineers?
    - TC 6.1 & 6.6 -
  - Plumbing Engineer (Contact Jim Tauby)

    - Manufacturer: Hubbard Holdrite

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

If you want a special seminar in the program, it must be scheduled during main meeting time, and not subcommittee time.

Future (not discussed)

Track 1:

- Sound Traps/Silencers – When are they necessary; E477 round robin (Jerry Lilly)
- End Correction, setting the record straight on AHRI 880 (Alex Michaud or Greg M)
- Sound attenuators and acoustical louvers (how they actually perform vs. how they are designed to perform) (Papadimos)
    - Testing Standard and Acoustical Louvers per E477 compared to current published NR and TL data

- 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)
- Predictions vs. Laboratory vs. Field Testing (Papadimos & Marks)
- Plumbing Noise
    - American Society of Plumbing Engineers?
        - TC 6.1 & 6.6 -
    - Plumbing Engineer (Contact Jim Tauby)
    - Manufacturer: Hubbard Holdrite
- ECM Motors

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

Houston 2018 (June 23 – 27, 2018)

Deadlines:
August 28, 2017 – Conference Paper Abstracts/Technical Papers Due
December 8, 2017 – Final Conference Papers Due
February 9, 2018 – Seminar, Forum, and Workshop Proposals Due

Track 1: HVAC&R Systems and Equipment

Track Chair: Frank Schambach
Email: frankschambach@mindspring.com
Selection of equipment and systems is paramount to HVAC&R design. Papers and programs in this track will assist designers, engineers, and operators in the design, selection, and operation of HVAC&R systems and equipment.

Track 2: Fundamentals and Applications

Track Chair: Dennis Alejandro
Email: denzjac@yahoo.com
Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

Track 3: District Energy and Cogeneration Plants

Track Chair: Kimberly Pierson
Email: kdpwildcat@gmail.com
As our world resources become more and more sparse there is an industry-wide movement toward efficiency and sustainability. One of the ways in which we can look to minimize our carbon footprint is to combine our resources. District energy systems and cogeneration plants do just that and are quite popular in some locales but have yet to gain traction in other developed cities. We will look at the advantages and limitations, do's and don'ts and best practices of utilizing this type of shared system.

Track 4: Safeguarding your HVAC&R System

Track Chair: Rich Rose
Email: richr@mticontrols.com
From seismic events to power outages and human error, how secure is your HVAC&R System? Mechanical, plumbing, electrical, and control systems all work together to create our living buildings, so it is imperative that designers and operators take into account the reactivity and interaction of these systems in response to natural disasters, human interference and other catastrophic events. Topics in this track include considering your design layout and accessibility, backup systems, supports and bracing, and more.

Track 5: Residential - Modern Buildings in Hot and Humid Climates

Track Chair: Dimitris Charalambopoulos
Email: dimitris@ashrae.gr
Residential dwellings require designers to consider a different scope of building functions, occupant use, and comfort. With increasing utility rates and a movement toward net zero housing, the traditional

residential design models are continuously diversifying and evolving. This track will discuss how we can integrate modern residential design and building practices into hot and/or humid climates with specific challenges ranging from indoor comfort to ventilation and mold.

Track 6: Professional Skills

Track Chair: Kevin Marple
Email: kmarple@benzco.com

This track is designed to provide professionals an opportunity to develop in the areas of presentation skills, leadership, teambuilding, understanding various business operations, interpersonal skills, etc. In short, the Professional Skills Track can cover all aspects of business outside of engineering/technical applications and lends itself to interactive session types such as workshops and forums.

Track 7: Research Summit

Track Chair: Melanie Derby
Email: derbym@ksu.edu
Active research, and the exchange of those research findings are critical to the development of our HVAC&R industry and environment. The sixth annual research summit invites researchers to share those results; and this year we announce an exciting collaboration with ASHRAE's archival research publication, *Science and Technology for the Built Environment* (STBE). Researchers are invited to present papers, seminars, forums or participate in panel discussions. Authors may also pursue an opportunity to further develop their submissions for later publication in STBE

Track 8: HVAC&R Control Freaks

Track Chair: Gary C. Debes
Email: gcdebes@verizon.net
This track will focus on all things controls (note: please see track 9 "MiniTrack" as well). We invite you to join this exchange addressing one of the most dynamic areas in HVAC&R. Topics may range from design innovations spreading through our industry to the latest in building integration and observation, or even troubleshooting the most common issues occurring in building management systems.

Track 9: HVAC&R Analytics

Track Chair: Vikrant Aute
Email: vikrant@umd.edu
This track will focus on the application of analytics algorithms/tools to automate systems. The tools and data are readily available, but the challenge is in using them in a timely and effective manner to add value to our HVAC&R Systems. By discussing the basics of analytics, methods, case studies and lessons learned we can consider if machine learning is ready to replace conventional controls.

For information on the technical program, special events, special sessions and general conference inquiries.
Conference Program Chair:
Cindy Moreno
Email: cindym@tmmechanical.com

For information on the technical program, special events, special sessions and general conference inquiries; Tiffany D. Cox**,** Assistant Manager of Conference Programs, Email: **tcox@ashrae.org**