

ASHRAE TC 2.6 Sound and Vibration Control

Main Committee Meeting Agenda

12-2 PM Monday, June 15, 2020

2020 Virtual Conference

NOTE: All Task Group Chairs and Subcommittee Chairs are asked to submit written report to the Secretary (Karina Saenz-Acosta) before Friday June 19, 2020

1. **Call to order** (Miller-Klein) [2 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** (Miller-Klein) [3 minutes]
 - 3.1. 13 members, 11 members present
4. **Review and approval of the minutes** (Saenz-Acosta) [3 minutes]
 - 4.1. Jerry Lilly (1st), Jason Swan(2nd), 11-0-0
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>
7. **Chair's announcements and correspondence** (Miller-Klein) [3 minutes]
 - 7.1. 2020-2021 Chair, Karina Saenz-Acosta
 - 7.2. 2020-2021 Vice Chair, Jeremy Stockman
 - 7.3. 2020-2021 Secretary, Paul Bauch
8. **Subcommittee reports (written reports to be provided to Secretary)**
 - 8.1. **Research Subcommittee** (Meeuwssen) [10 minutes]
 - 8.1.1. Research Chair's meeting report
 - 8.1.2. Work Statements/RTAR's/URP's
 - 8.1.2.1. TRP-1707 Annoyance Thresholds of Tones in Noise as Related to Building Services Equipment. A 1 hour long presentation on results has been put together. Presentation will be scheduled in July.
 - 8.1.2.2. TRP-1852 Develop performance metric, criteria, and process to measure and predict speech privacy in High Performance Buildings. A six-month no-cost extension was approved by ASHRAE Research.
 - 8.1.2.3. WS-1829 Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement (Fan Arrays) for Air and Sound Performance. It was submitted to RAC. RAC is holding for co-founding from AMCA or AHRI.
 - 8.1.2.4. PTAR – update Application of Manufacturer's Sound Data book (Eichelberger). The PTAR was approved by RAC and forwarded to the Publication Committee, but they have not acted on it. It is still a work in progress.
 - 8.1.2.5. WS-1754 Developing the Standard Test Method for Dynamic Characteristics of Large Vibration Isolators. The work statement has been revised and distributed to team for review. There is a section in Basecamp with all this information.

8.1.3. Research Chairs Breakfast is on July 8th.

8.2. Programs Subcommittee (Swan) [10 minutes]

8.2.1. Program Chair's meeting report

8.2.2. Programs this meeting

8.2.2.1. Monday 22 June, 8:00 to 9:00 AM

Track 6: Beware! Be Aware of These Common Acoustical Concerns in Multi-Family Buildings

(Miller-Klein: Dong/Rawlins, Golden)

8.2.2.2. Monday 22 June 8:00 to 9:00 AM

Track 2: When is "Quiet" Quiet Enough? Understanding Sound Generation in Magnetic Bearing Machines (Hunt: Marks, Kollevoll) with TC 8.2

8.2.2.3. Monday 22 June 8:00 to 9:00 AM (TC 5.2)

Designing Energy Efficient Duct Systems

ASHRAE Duct Systems Design Guide

(Idem: Brooks, Reints, Idem)

8.2.2.4. Hot topics: Pandemic effects on acoustics. Date: TBD

8.2.3. Programs at Chicago 2021

8.2.3.1. Proposals due August 3rd, 2020

8.2.3.2. Looking at:

8.2.3.2.1. Track 5: Elevators / 90.1 (Boldt: M-K, 'Otis')

8.2.3.2.2. Track 4: Noise effects on health (Miller-Klein) with TC 2.1/9.6 - Changes due to H&S increase noise/vibration

8.2.3.2.3. Track 2: Tunnel/ Underground ventilation (LaForgia) with TC 5.1

8.2.3.2.4. Track 1/5 (Myths): Noise & Vibration – Case Studies for Design & Remediation (Miller-Klein: Bauch, Keith, Miller-Klein)

8.3. Publications Subcommittee (Wise) [10 minutes]

8.3.1. Handbook chapters

8.3.1.1. Handbook Fundamentals 2021 (Wise)

8.3.1.1.1. Submittal for this revision is due to ASHRAE on March 22nd.

8.3.1.1.2. This chapter does not need any changes.

8.3.1.1.3. 3 members agreed to do a final proof-reading.

8.3.1.2. Handbook Applications 2023 (Wise)

8.3.1.2.1. All the focus at this time is the Vibration Section

8.3.1.2.2. Set a 2-year time frame to address deficiencies

8.3.1.2.3. 5 members volunteered to look into this and report progress in Austin this June.

8.3.1.2.4. The next big revision deadline for submittal is March 22nd, 2022. The document has then to be completed for voting in Las Vegas, January 2022.

8.3.2. Other publications

8.3.2.1. Curt Eichelberger developed a PTAR requesting ASHRAE to consider a general level of funding for a major rewrite. This was passed along to ASHRAE Publications, waiting for their analysis.

8.4. Web page (Saenz-Acosta)

8.4.1. Added past programs into the website

8.4.2. Need to find a way to link past programs; Basecamp could be an option.

8.5. Standards Subcommittee (Bridger) [10 minutes]

8.5.1. SPC 189.1 – Design for High Performance Green Buildings (Miller-Klein)

8.5.2. Updates from Other Standards Organizations

8.5.2.1. AHRI

8.5.2.1.1. New standards process with turn-over in standards department.

8.5.2.1.2. TCoS have not met since Orlando meeting.

8.5.2.1.3. Anybody, consultants, academia, manufacturer, is now welcomed to participate in AHRI.

- 8.5.2.2. AMCA (Brooks)
- 8.5.2.3. ANSI (Reuter)
- 8.5.2.4. ASTM E33 (Lilly/Shafer)
 - 8.5.2.4.1. New metric for impact noise
- 8.5.2.5. ISO (Golden)
 - 8.5.2.5.1. Looking to change absorption standard, ISO 364.

8.6. Standing Subcommittees [10 minutes]

- 8.6.1. Vibration Isolation (M Hooti)
 - 8.6.1.1. Looking for a chair

8.7. Operations Subcommittee (Miller-Klein) [15 minutes]

- 8.7.1. Honors and awards (Miller-Klein)
- 8.7.2. Long range planning (Miller-Klein)
- 8.7.3. Membership (Miller-Klein)
 - 8.7.3.1. Rolling off: Erik Miller-Klein, Jerry Lilly
 - 8.7.3.2. Rolling on: Jeremy Stockman, Paul Bauch
- 8.7.4. Liaisons (Miller-Klein)
 - 8.7.4.1. ASHRAE TC 2.1 Physiology and Human Environment (Eichelberger)
 - 8.7.4.1.1. TC 2.1 is interested in the Tones research project.
 - 8.7.4.1.2. The effects of ventilation to sleep. Project has been stalled because of COVID.
 - 8.7.4.2. ASHRAE TC 2.7 Seismic and Wind Resistant Design (Marks)
 - 8.7.4.2.1. Subcommittee meetings are next Friday, June 19th.
 - 8.7.4.2.2. Main meeting is on July 7th.
 - 8.7.4.3. ASHRAE TC 5.1 Fan Design and Application (Osborn)
 - 8.7.4.3.1. Trying to put together research project on lab test method of fan walls
 - 8.7.4.4. ASHRAE TC 5.2 Duct Design (Hassler)
 - 8.7.4.5. ASHRAE TC 5.3 Room Air Distribution (Zimmerman)
 - 8.7.4.6. ASHRAE TC 9.6 Healthcare (Koukounian)
 - 8.7.4.6.1. Meeting sometime this week.
 - 8.7.4.7. ASHRAE TC 9.7 Educational Facilities
 - 8.7.4.7.1. No liaison or anything going on.
 - 8.7.4.8. ASA (Reuter)
 - 8.7.4.8.1. Chicago meeting was pushed to Fall. Cancun meeting was cancelled.
 - 8.7.4.9. VISCMA (Waters)
 - 8.7.4.10. Others: INCE/InterNoise (Golden) NoiseCon was postponed into the Fall. There is no desire for virtual conference. NCAC (Bridger) it is not meeting this year. EGSA (Simmons) Spring meeting was cancelled. Fall meeting is still scheduled. Nothing new that is related to TC 2.6.

9. New business/Old business [5 minutes]

10. Next meeting date and location – Chicago, IL January 2020

11. Adjournment

Research report – Conference Call – June 15, 2020

Research project status:

TRP-1707 - Annoyance Thresholds of Tones in Noise as Related to Building Services Equipment

- Project is nearly complete, Patricia Davies principal investigator
- PMS chaired by Kim Osborne, PMS meeting with investigators for progress review weekly, face to face at Purdue on May 3 and August 7 2019.
- A presentation from the investigators will be schedule for July.
- Expect to get final report this summer.

TRP-1852 - Develop performance metric, criteria, and process to measure and predict speech privacy in High Performance Buildings

- Contract has been awarded to Soft dB, principal investigator Roderick Mackenzie.
- A six month no-cost extension was approved by ASHRAE Research.

WS-1829 - Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement (Fan Arrays) for Air and Sound Performance

- Work statement was revised per comments from TC and RAC, and submitted to RAC. RAC is holding for co-funding from AMCA or AHRI.

PTAR – update Application of Manufacturer’s Sound Data book – Eichelberger

- The PTAR was approved by RAC and forwarded to the Publication Committee over a year ago, and they have not acted on it. Update from Curt?

WS-1754 - Developing the Standard Test Method for Dynamic Characteristics of Large Vibration Isolators

- Roman Wowk has revised the work statement and distributed to team for review
- Got a few more volunteers for the team, Greg will schedule a conference call.
- The RTAR has fallen off the active list, but we can still submit a work statement under it. RAC can decide if they want to assign a new number.

New RTAR under development “The effects of duct size and aspect ratio on flow noise in elbows”, author Brandon Cudequest.

From the Research Chairs Breakfast:

- Scheduled for July 13

ASHRAE TC 2.6 Sound and Vibration
PROGRAMS SUBCOMMITTEE – 2020 Winter Meeting, Orlando, Florida

THIS MEETING:

“Austin” Virtual, June 29 – July 2 2020

Tracks:

- 1: 1: Fundamentals/Applications
- 2: HVAC&R Systems/Equipment
- 3: Research summit
- 4: Professional Development
- 5: Grid-interactive Efficient Built Environment
- 6: Multifamily & Residential Buildings
- 7: Resilient Buildings & Communities
- 8: Zero Energy Buildings & Communities
- 9: Building Myths

Seminar 19: Beware! Be Aware of These Common Acoustical Concerns in Multi-Family Buildings (Track 6) (Miller-Klein: Dong/Rawlins, Golden)

Seminar 31: When is “Quiet” Quiet Enough? Understanding Sound Generation in Magnetic Bearing Machines (Track 2) (Hunt: Marks, Kollevoll)

NEXT MEETING:

Chicago, 23-27 January 2021

Tracks:

- 1: HVAC&R Fundamentals/Applications
- 2: Systems and Equipment
- 3: Refrigeration and Refrigerants
- 4: Environmental Health Through IEQ
- 5: Building Performance and Commissioning for Operation & Management
- 6: Energy Conservation
- 7: International Design
- 8: Standards, Guidelines & Codes

Seminars/ Workshops/Forums:

Proposals due: 8 July 2020
Bring up in monthly calls

Track 2/3: Maglev chillers/ compressors (Marks) with TC 8.2

Track 4: Noise effects on health (Miller-Klein) with TC 2.1

Track 7: Tunnel/ Underground ventilation (LaForgia)

Technical/Conference Papers:

Conference Paper Abstracts due: 18 March 2020
Technical Papers due: 18 March 2020
Paper session requests due: 18 March 2020
Final Conference Papers due: 8 July 2020
Final Technical Papers due: 10 August 2020

FOLLOWING MEETINGS:

Phoenix, 26-30 June 2021

Tracks:

- 1: Fundamentals and Applications
- 2: HVAC&R Systems and Equipment
- 3: Research Summit
- 4: Professional Development
- 5: Critical Environments: Design/Control/Operation
- 6: HVAC&R for Indoor Plants & Animals
- 7: Future Proof: Renewable/Regenerative/Resilient
- 8: Hot, Hot, Hot (warmer climates)

Seminars/ Workshops/Forums:

Proposals due: Thursday 18 (or Monday 22) Feb 2021

Accept/reject notifications: Friday 2 April 2021

Technical/Conference Papers:

Conference/Technical Paper accept/reject: 18 Feb 2021

TP: Tones and Background Noise (RP-1707)

Las Vegas, 29 Jan – 2 Feb 2022

Toronto, 25-29 June 2022

Atlanta, 4-8 February 2023

Tampa, 24-28 June 2023

TOPICS FOR FUTURE PROGRAMS

Series: Equipment Noise

Air Distribution Systems (Zimmerman)
Boilers (Marks)
Compressors: Frequency Characteristics (Rockwood)
Duct Breakout Noise (Reynolds)
Ductless Systems: PTACs, WSHP (Weinstein)
Electrical: Xfmrs, Elec Motors (Papadimos)
Elevators (Lilly)
Exhaust Noise (____)
Fan Boxes above/below (Zimmerman)
Fan Selection for Acoustics (Schaffer)
Fume hoods
Generators (LaForgia)
Industrial Ventilation (____)
 dust collection, garages, LNG
Maglev chillers
Pumps (____)
Plumbing noise (Wowk) TC 6.1/6.6?
Refrigeration: Commercial/Transport (Marks)
Silencers: Performance v Design (Papadimos)
Silencers: When? E477 Round Robin (Lilly)
Small Fan Coils (____)
Tankless water heaters
Under-floor Air Systems (Reynolds)
Variable Capacity Compressors (____)
VAV, CAV, VFD (w/5.1) (Gierzak)
 Insulation of

Format:

1. What it is, types, how works, why noisy
2. Standards, specification, lab data, mitigation methods
3. Field issues, case studies, testing

Series: Basics of HVAC Noise

Applications Chapter Review (____)
Commissioning (____)
Effects of 'over-design' (Lilly)
How Noise Affects Design Process (Lilkendy)
Noise and Productivity (Wang)
Noise Calculations How To (CD?) (Peterman)
Noise Flanking Paths (Peppin)
Outdoor Noise Control (Murillo/Peppin)
Predicted vs Actual Noise (Papadimos)
Prediction vs Lab vs Field (Papadimos/Marks)
Room Msmt: Test Method (Rockwood)
Speech Privacy in Low Noise Offices (____)
Tones and Background Noise (Wowk)
Tones and Fluctuations (Lilly)
Vibration Isolation (Keith)

Other Topics:

Classrooms: ICC adopts S12.60 (Bridger)
Design of Healthcare Facilities (Miller-Klein)
 Alarm fatigue, FGI Guidelines, Privacy
 Team up with healthcare TCs?
Labs internal: Air Valves/Fume Hoods (Wouk)
Labs external: Stacks, ventilation, nozzles
Mission Critical Facilities (____)
Noise Fluctuations (Lilly)
Passive vs Active (Wise)
Performance Rated Buildings (Roy)
Standard Test: Seismic Devices (w/2.7)
Tunnel Ventilation (LaForgia)
Vibration: Upper Level Installations (Simmons)
Industrial noise (Keith)

Past Items:

Track ?: Elevators (Marks) Otis? (Keith?)

*Track ? : Hearing protection: TWA, Hospitals,
Escape / S/N / STI, WHO*

Track 3: Refrigerated processes/Storage (Swan
 offered Keith's talk to TC10.5)

Track 7: Tunnel/ Underground ventilation
 (LaForgia)

Track X: Plenum array fans

[Contact other TCs that may want to team up]

PAST PROGRAMS

2020 Orlando/Austin

Vibration Isolation Advances (Golden, Scarlett, Meeuwssen)

HT: ANSI S12:60 / FGI vs 189.1 (Miller-Klein)

HT: Speech Privacy (Koukounian)

2019 Atlanta/Kansas City

RP-1408 Ductwork research (Herrin, Schwob)

VRF Systems (Lilly, Miller-Klein, Wowk)

Noise/Vib Equipment Selection (Boldt, Eichelberger, Wowk)

HT: IBC updates (Schmeida)

HT: Basecamp (Miller-Klein)

Commissioning (Miller-Klein, Swan)

Chilled Beams (Searle, Peterman, M-K)

Blocked Impedance (Meeuwssen)

2018 Chicago/Houston

Impacts of Safeguarding Buildings/HVAC Systems (Miller Klein)

HT: User Manual 189.1 Acoustic Control, Next Steps

HT: LNG Facilities (R Keith)

2017 Las Vegas/Long Beach

Acoustic Performance Standards for Residential Buildings (Miller-Klein)

HT: Mech Equipment Vibration & Structural Interaction (Wowk)

2016 Orlando/St Louis

TP: Simulating Noise Attenuation in Ducts (Kuehn)

Acoustics in Multi-Family Residential Environments (Papadimos)

Avoiding Pitfalls Integrating Seismic and Sound Control (w/2.07)

HT: Algorithms for HVAC Acoustics

2015 Chicago/Atlanta

System Effects from Inlet of Centrifugal/Plenum Fans (w/5.1,5.9)

Acoustic Mitigation for Lightweight Roof Assemblies (Miller-Klein)

Green Building Acoustics (Miller-Klein)

HT: Condensing Units on Lightweight Roof (Lilly)

HT: Sound measurement in rooms (Lilly)

2014 New York/Seattle

Equipment: Hydronic Systems (Miller-Klein)

Basics: Environmental Noise Impact & Mitigation (Wang)

2013 Dallas/Denver

Basics of HVAC Noise Control (Miller-Klein)

Numerical Methods for Noise/Vibration Simulation (Eichelberger)

HT: ASHRAE 189.1

2012 Chicago/San Antonio

Vibration Induced Noise & Mech Equipment Isolation (Marks)

HT: BIM and Acoustics

Impacts of Poor Aerodynamic HVAC Conditions (Schaffer)

New Acoustical Criteria and Measuring Methods (Peterman)

Review of Updated AHRI Standards (Papadimos)

2011 Las Vegas/Montreal

Recent Research: Healthcare Facility Acoustics (Papadimos)

Acoustic Codes/Standards/Guidelines (Muehleisen)

HT: Classroom Physical Environment Effects on Learning (Reynolds)

Fan Array Efficiency/Performance (Raychaudhuri)

Forum: Incorporating Acoustics into BIM (Peterman/Mitchell)

2010 Orlando/Albuquerque

Acoustics in High Performance Building (Peterman)

Noise & Mech System Design Process (Lilkendey)

Multiple Plenum Fans in an Array (Ganesh)

HT: Criteria (Paige) / Lined Duct End Reflection (Lilly)

HT: Int'l GBC (Marks) / Terminal Unit Tests/ASHRAE 130 (Peterman)

Classroom HVAC Noise Control (Lilkendey)

Unique Case Studies (Papadimos)

TP: Effects of Mech System Noise on Human Perf./Perception (Roy)

Sustainability and Our Environment (Ronsse)

2009 Chicago/Louisville

Staff Performance/Patient Welfare in Healthcare Facilities (Wang)

2008 New York/Salt Lake City

TP: End Reflection (RP-1314) (Eichelberger)

TP: Fan System Effects (RP-1219) (Eichelberger)

2007 Dallas/Long Beach

Acoustics for Green Buildings (Roy)

Acoustic vs Seismic (Lama/Marks/Blazier)

Lab Noise Control (Johnson/Moiseev)