



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. 7.7 DATE JULY 4, 2016

TC/TG/MTG/TRG TITLE TESTING AND BALANCING

DATE OF MEETING JUNE 27, 2016 LOCATION ST LOUIS –AMERICA'S CENTER ROOM 221

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Justin Garner	2015	David Bornside	2013	Tom Schlachter
Donald Prather	2015	James Hocter	<u>2013</u>	Byron Hagan
Lloyd Le	2015	TOTAL	2	Mark Hegberg
Frank Spevak	2012			Gerald Kettler
Gus Farris	2012			Richard Rose
Tom Cappelin	2015			Jerry Lemeus
John Hamiltion	<u>2015</u>			Peng Yin
TOTAL	7			Robert Moss
				Kyle Sunder
				Michael Langton

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

TAC Section Head	Adrienne Thomle	adriene.thomle@honeywell.com
TAC Chair	Thomas Lawrence	lawrence@engr.uga.edu
ALI / PDC Liaison	Cameron Labunski	cameronl@tgce.com
Chapter Tech Transfer Chair	Michael Cooper	mcooper@mccgroup.com
2019 HVAC Applications	Bryan Becker	beckerb@umkc.edu
Research Liaison	Phillip Haves	phaves@lbl.gov
Standard Liaison	Rick Larson	rick.ashrae@gmail.com
Manager of Standards	Stephanie Reiniche	sreinichie@ashrae.org
Staff Liaison	Mike Vaughn	MORTS@ashrae.net

MINUTES
TC 7.7 TESTING AND BALANCING
ANNUAL CONFERENCE
MONDAY - JUNE 27, 2016 (2:15 – 4:15 pm)
AMERICA'S CENTER - ROOM 221
ST LOUIS, MO

1. CALL TO ORDER

Chairman Garner asked all guests to provide contact information on one of the sign-in sheet that was being passed around.

A. Attendance: 7 of 9 voting members present – quorum is present

2. INTRODUCTIONS

Vice Chair Prather asked those attending to introduce themselves and identify the organization or company they represent.

3. APPROVE MINUTES FROM LAST MEETING

Minutes from the Atlanta meeting were passed out. After a brief discussion, it was noted Mr. Cappelin was in attendance, however he left early. A motion to accept the minutes as amended was made by Mr. Prather and seconded by Mr. Hamilton. The motion passed 7-0-0

4. RECOGNIZE LIAISONS

Section Head Adriene Thomle arrived midway thru the meeting; she reported that this was her last conference as our TAC Section Head. Help she Chairman Garner thanked her for all of the assistance she provided him as he assumed Chairmanship and all the guidance she has provided TC 7.7 over the years. The committee responded with a round of applause.

5. DISCUSS ISSUES FROM TC BREAKFAST

Chairman Garner briefly covered the information provided at the TC breakfast.

6. SUBCOMITTEE REPORTS

A. Handbook - Mark Hegberg

There was a brief discussion regarding the revised hand book chapter. The revisions were not included in the last printing. However, i motion was n Orlando the committee voted to have the revised approved chapter submitted for posting on the ASHRAE On-Line Handbook. The motion was seconded by Mr. Rose.

Mr. Hegberg indicated he did not know the status of the on-line version. Vice Chair Prather indicated that he had a response from ASHRAE the updated chapter has not yet been posted on-line. Hegberg will follow-up to see if there is a scheduled future date for the on-line version to be updated.

B. Program - Tom Schlachter

Mr. Schlachter reported that TC 7.7 and TC 1.2 are co-sponsors for a Seminar to be held at this conference. Dr.Terry Beck w/ K-State will be presenting the results from RP-1245 regarding traverse locations, method of traverse (Equal Area vs Log-T) and instrumentation (Pitot tube vs Hot Wire Anemometer). The seminar is scheduled for Tuesday June 28th @ 9:45 am in America's Center Room 223. This information was previously printed in "Science & Technology in the Built Environment"

Chairman Garner has proposed filling for a seminar to be presented at the next meeting in Las Vegas. The seminar will be informative, regarding his Lab testing of Blade and Venturi terminal controls and installation. TC 9.10 Lab systems has volunteered to provide two speakers; 1-Pro's of Blade damper terminals or where they are a better application over Venturi terminals 1- Pro's of Venturi terminals or where they are a better application over Blade damper terminals.

Mr. Prather suggested a potential future program regarding residential TAB.

C. Membership - Justin Garner

The following members would be rolling off as voting members: Mr.'s. Spevak and Farris. The following will become new voting member on July 1st : Mr's. Hagan & Rose. With Garner, Prather, Cappelin, Bornside, Hamilton, Hocter & Le the remaining voting members.

D. Research - Frank Spevak

Mr. Spevak reported the following information on ASHRAE Research:

- RAC looking for more Applied Research
- Research funds for post project processing that will produce tools, presentation, etc that add value to the membership and society
 - 2nd bid package for the post data research project to perform applied research to make a tool
- Updated Research Manual will be posted after St. Louis that will include new milestones for PMS as well as other changes
- Presently working on an RTAR on Flow Measuring Devices (Flow Hoods), progress has stalled and he is looking for assistance.
- Currently TC7.7 & 5.3 are co-sponsoring RP-1741, May add TC 4.7 as 2nd co-sponsor
 - FCU energy usage at full & part loads

Note: See attached Research Report

E. Journal - Justin Garner

Committee is seeking a volunteer to serves as TC 7.7 liaison.

F. Standards

STD 111 - Gaylon Richardson

Chairman Garner indicated there is no report; Mr. Richardson is not attending the conference. Completion is scheduled for next meeting in Las Vegas.

Note: After the TC meeting Mr. Richardson e-mailed an apology to the Standard 111 members, and noted the work that needs to be completed for Las Vegas.

GPC 11 - Tom Schlachter

Mr. Schlachter reported that progress continues to be made updating the guideline. The committee met on Saturday 6/25/2016 and has held monthly teleconferences. Tentative completion of First Draft is slated for next summer's Conference in Long Beach, this will be after Standard 111 is completed.

G. Education – Justin Garner

Committee is seeking a volunteer to fill this position.

H. Web Master – Aldin Andrade

Current sub-chair Mr. Andrade could not be in attendance, Chairman Garner is reporting for Mr. Andrade. Presently draft minutes from last two conferences are posted on TC 7.7 web page. Mr. Garner requested final minutes from Atlanta & Orlando w/ any corrections be forwarded to Mr. Andrade.

7. LIASON REPORTS FROM OTHER TC'S OR ORGANIZATIONS

TC 1.2 Instruments & Measurements - Frank Spevak

- Two programs at this conference
 - Non-conforming Traverse Locations, TC-7.7 Co-sponsor, results from RP-1245
 - Verification of Standard 42; Lab Testing of Airflow
- SSPC 41.2 Standard Methods for Uncertainty Analysis
 - Out of date, working on new examples

TC 1.4 Control Theory & Application - David Bornside; Liaison not present

- Mr. Hegberg reported TC 1.4 working on research proposal regarding control valves

TC 5.2 Duct Design – Gus Farris

- Progressing with design guide

TC 5.3 Room Air Distribution - Byron Hagan & Gus Farris

Byron Hagan

- Organized oversite committee for RP-1741, Fan Coil unit Energy
- TC 7.7 representative is Tom Schlachter
- Committee met Friday in St. Louis and selected a vendor to perform research

Gus Farris

- RP-1741 is direct result of RP-1292 (FPVAV modeling of Heat & Mass Balance)
- To date RP-1292 has had 20 papers presents, 4 paper best in show
- Two more papers will be presented Wednesday @ 8:00am

TC 5.6 Control of Fire & Smoke - Gerald Kettler

- GPC-1.5 (smoke Control) returned from review and is currently being cleaned-up

TC 6.1 Hydronic & Steam Heating Equipment & Systems - Don Prather

- Meets Tuesday @ 1:00pm, no other report

TC 7.9 Building Commissioning - Gerald Kettler

- SSPC-202, Super Committee formed to support multiple guidelines

TC 9.10 Laboratory Systems - Lloyd Lee

- Meets Tuesday @ 3:30pm, no other report

AABC – Gaylon Richards – Liaison not present, report by Mr. Garner

- The new “ANSI approved” standard is being distributed
- Updated training manual is nearing completion
- Starting voluntary continuing education program

NEBB – Richard Rose

- NEBB working on ANSI CX standard

SMACNA – Eli Howard; Liaison not present, no other report

ACCA – Don Prather

- New on-line training with certificate for CEU

ICB / TABB – John Hamilton

- Mr. Hamilton reported TABB is continuing to work with the state of California on standard forms used for Energy Certification of HVAC system at the time of building start-up. When there are 300 certified providers they are looking to go-online. Multiple states have shown interest.

8. OLD BUISNESS

- At last conference, Mr. Richardson volunteered to write a specific answer to Technical FAQ #83 and present to the committee for review at the next meeting in St. Louis.
- Mr. Richardson is not present and has not presented an answer for the TC to review.
- Chairman Garner to follow-up with Mr. Richardson

9. NEW BUISNESS

- **ASHRAE Code Interaction Sub-Committee (CIS)**
 - Mr. Hamilton requested he be appointed TC 7.7 liaison.
 - Motion for appointment made by Mr. Prather, 2nd by M r. Lee.
 - Motion passed 7-0-0
- **ASHRAE SPC-202**
 - Mt. Garner requested he be appointed TC 7.7 liaison
 - Motion for appointment made by Mr. Hamilton, 2nd by M r Spevak.
 - Motion passed 7-0-0

10. ADJOURN

Motion to adjourn was made @ 4:00pm by Mr. Spevak, second by Mr. Hamilton and accepted by committee consensus.

NEXT MEETING:

Las Vegas, NV

Monday January 30, 2017 2:15 – 4:15 pm

ASHRAE Research Sub-Committee Breakfast Meeting
Monday June 27, 2016, St. Louis, MO

Main points-

- RAC looking into more Applied Research
- Evaluate concept of allocating Research funds for post project processing that will produce tools, presentation, etc that add value to the membership and society
 - Could be a second bid package for the post data research project to perform applied research to make a tool
- Presidential AdHoc Impact of ASHRAE Research on society has transitioned into an MTG with Dan Pettway as chair
- ASHRAE is not accepting URP as there are changes taking place and information will be posted after St. Louis
- Updated Research Manual will be posted after St. Louis that will include new milestones for PMS as well as other changes
- RAC will place emphasis on PMS training with new milestones, chairs and committees
- ASHRAE has been placing completed Research online. Presently there are about 250 projects online. Access to final report is available to ASHRAE members free of charge. Will eventually have all research online, roughly 1,000 projects.
- RTAR and Work Statements
 - 9 RTARs considered – 1 accepted, 4 conditionally accepted, 4 rejected
 - 10 work statements considered – 6 conditionally accepted, 4 returned
 - Conditionally accepted – provide a cover letter of how the comments were addressed
 - All co-sponsoring TCs should be providing input to the RTAR and WS development
 - Abstentions and negative votes require reasons for the abstention or negative vote
- It is the responsibility of the Research Sub-Committee Chair to know what can or can't be done and to convey the same to the PES/PMS chairs and the TC

TC 7.7 – Program Report

June 27, 2016 – St Louis

Tom Schlachter

1. TC 7.7 Co-Sponsor of a Seminar with TC 1.2
 - Seminar 38 Tuesday @ 9:45 – ACC Room 223
 - Speaker is Dr. Terry Beck, K-state, regarding RP-1245 results
 - There will be two papers presented
 - **Effect of fittings on volumetric air flow measurements (RP-1245):**
 - **Single-path duct disturbances”,**
 - **“Effect of fittings on volumetric air flow measurements (RP-1245):**
 - **Multiple-path (tee) duct disturbances**
 - Please plan on attending and ask questions regarding:
Log-T vs Equal Area traverse methods
2. Seminar for Las Vegas “Venturi vs Blade”
 - Gaylon Richardson volunteer to chair
 - I attended TC 9.10 Laboratory Systems Program meeting and requested two speakers for 20 min each
 - Pro – Blade
 - Pro – Venturi
 - James Coogan & Thomas Smith volunteered
 - Justin Garner to speak for 35 min regarding EAB lab testing
 - 15 Min for questions
 - Garner to file seminar proposal before August 8,2016

NOTE: SEMINAR SUBMISSION DEADLINE FOR LAS VEGAS IS AUGUST 8TH

3. Potential future programs
 - Log – T vs Equal Area Traverse methods
 - TAB Cx procedures and items to document for
 - VAV terminals
 - VAV Air Handling unit w/ emphasis on Economizer
 - VAV Htg/Clg systems

Note: We are looking for Volunteer presenters for Las Vegas, NV Winter 2017

Las Vegas – Winter 2017

Submission Dates and Track Information

This is the overall publication schedule for the 2017 ASHRAE Winter Conference, Las Vegas. For specific details and questions regarding these dates, please contact the appropriate Track Chair.

March 14, 2016	Conference Paper abstracts due
April 18, 2016	Technical Papers Due
April 4, 2016	Conference Paper Abstract Accept/Reject Notifications
June 6, 2016	Website Opens for Seminar, Forum and Workshop Proposals
July 6, 2016	Final Conference Papers Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment)
August 8, 2016	Seminar, Forum and Workshop Proposals Due
September 7, 2016	Seminar, Forum, Workshop Accept/Reject Notifications

- **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: gcdeb@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: mr.alazazi@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 performance with modeled expectations.

Conference Program Chair: [Leon Shapiro](#) Email: Leon.Shapiro@ashrae.org

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

Long Beach – Summer 2017

Submission Dates and Track Information

This is the overall publication schedule for the 2017 ASHRAE Annual Conference, Long Beach. For specific details and questions regarding these dates, please contact the appropriate Track Chair.

August 29, 2016 Conference Paper Abstracts and Technical Papers Due
 September 9, 2016 Conference Paper Abstract Notifications Due
 December 9, 2016 Final Conference Papers Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment)
 January 2, 2017 Website Opens for Seminar, Forum and Workshop Proposals
 January 16, 2017 Conference Paper Accept/Revise/Reject Notifications Due
 February 6, 2017 Seminar, Forum and Workshop Proposals Due
 February 10, 2017 Revised Conference Papers/Final Technical Papers Due
 February 20, 2017 Conference and Technical Paper Final Accept/Reject Notifications

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

Chair: Jennifer E. Leach Email: pennst8jen@yahoo.com

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

What

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.

The

Track 4: Building Life Safety Systems

Email: alan_neely@pghcorning.com

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 Chair: Robert Alan Neely

Building life safety systems are critical in commercial

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

Chair: Melanie Derby Email: derbym@ksu.edu

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 questions are 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

This track will explore

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

Chair: Dennis Alejandro Email: denzjac@yahoo.com

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

High

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

Chair: Jason DeGraw Email: jason.degraw@nrel.gov

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

Title 24 and

Track 8: Residential Buildings: Standards Guidelines and Codes

Kimberly Pierson Email: kdpwildcat@gmail.com

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 Chair:

ASHRAE is known for its

Track 9: Research Summit

Ann Peratt Email: ann.peratt@gmail.com

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.

Track Chair:

The fifth annual Research

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