

**AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND
AIR CONDITIONING ENGINEERS, INC.**

1791Tullie Circle, NE / Atlanta, GA30329
(404) 636-8400

TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO.:	4.10		TC/TG/TRG TITLE:	INDOOR ENVIRONMENTAL MODELING			
DATE OF MEETING:	January 23, 2012		LOCATION:	Chicago, IL			
DATE ISSUED:	March 23, 2012		RECORDED BY:	Atila Novoselac			
VOTING MEMBERS	TERM		PRESENT	OFFICERS		TERM	
	On	Off				On	Off
VanGilder, Jim	11	14	✓	Chair	VanGilder, James	11	13
Chen, Qingyan (Yan)	09	13	✓	Vice Chair	Bennett, Jamie	11	13
Kato, Shinsuke (Intl.)	09	13	✓	Secretary	Novoselac, Atila	11	13
Bennett, Jamie	11	15	✓	Programs	Rimmer, Julian	08	N/A
Lin, Chengxian (Charlie)	08	12	✓	Research	Srebric, Jelena	06	N/A
Musser, Amy	09	13	✓	Handbook	Banks, David	05	N/A
Dols, Stuart	11	15	X	Membership	Wang, Liangzhu (Leon)	11	N/A
Horstman, Ray	11	15	X	Standards	Ensor, David	05	N/A
Srebric, Jelena	09	13	✓	Web Page	Dols, William (Stuart)	07	N/A
Sanchez, Greg	11	15	X	Honors and Awards	Horstman, Ray	05	N/A
Zhang, Yuanhui	08	12	X	ALI	Zhai, John	04	N/A
Greg Dobbs	11	15	X				
Wang, Liangzhu (Leon)	11	15	X				
Banks, David	11	15	✓				

Technical Committee 4.10 – Indoor Environmental Modeling

CORRESPONDING MEMBERS	PRESENT	CORRESPONDING MEMBERS	PRESENT
Abernathy, Stephen V		Jones, Gordon G	
Al-Alusi, Thamir R		Jones, Robert S	
Anderson, Ren S		Khalifa, H. Ezzat	✓
Arens, Edward A		Kang, Kai	
Armstrong, Peter R		Kato, Shinsuke	✓
Axley, James W		Keen, Julia A	
Banks, David	✓	Kelso, Richard M	
Bansal, Pradeep Kumar		Kerr, Carolyn M	
Barakat, Sherif		Kim, Man-Hoe	
Barles, Pierre		Kirkpatrick, Allan T	
Beausoleil-Morrison, Ian		Knappmiller, Kevin D	
Becker, Bryan R		Knight, Kelly J	
Becker, Bryan R		Kolesnikov, Alexy	
Bennett, James (Jamie)	✓	Krafthefer, Brian C	
Berkoe, Jonathan M		Lebbin, Paul A	
Blackmore, Byron P		Levin, Hal	
Chakroun, Walid		LeViseur, Suzanne	
Chen, Qingyan (Yan)	✓	Lin, Chao-Hsin	✓
Christianson, Leslie L		Lin, Chengxian (Charlie)	✓
Clark, Daniel R		Macdonald, Iain Alexander	
Colliver, Donald G		Manning, Andy	
Cui, Jie		McGinn, Tim J	
Dobbs, Gregory M		Melikov, ArsenKrikor	
Dols, William Stuart		Murakami, Shuzo	
Elmahdy, Hakim		Musser, Amy B	✓
Emmerich, Steven J	✓	Nawrocki, Tracey L	
Ensor, David S		Newman, H Michael	
Gadgil, Ashok J		Nielsen, Peter V	
Gordon, Elliott B		Novoselac, Atila	✓
Grimsrud, David T		Olesen, Bjarne W	
Grot, Richard A		Pei, Hsien-Sheng J	
Haghighat, Fariborz		Petersen, Ronald L	
Hall, John D		Peterson, Janice C	
Hensen, Jan L M		Rahai, Hamid	
Hernandez, Mark		Ramspeck, Claire	
Hirnikel, Daniel J		Rimmer, Julian	
Horstman, Raymond H		Rivers, Richard D	
Hosni, Mo	✓	Rogers, Lisa J	
Int-Hout, Daniel		Sanchez, Greg	
Jeffers, Gregory R		Sawachi, Takao	
Sestak, George J		Seppanen, Olli A	

Technical Committee 4.10 – Indoor Environmental Modeling

Shaw, Chia-Yu		Walton, George N	
Sinclair, Ray J	✓	Wang, Liangzhu (Leon)	
Sohn, Chang W		Wang, Xinlei	✓
Srebric, Jelena	✓	Wark, Christopher G	
Tan, Liangcai		Willman, Alexander	
Teichman, Kevin Y		Yang, Xudong	✓
Tompkins, Dean T		Yoshizawa, Susumu	
Topp, Claus		Zhai, Zhiqiang (John)	✓
Tronville, Paolo		Zhang, Dexian	
Tully, Bradley		Zhang, Jianshun S	
VanGilder, Jim	✓	Zhang, Tengfei	
Vandermeulen, Paul R		Zhang, Wei	
Vaughn, Michael R		Zhang, Xuanhang (Simon)	
von Kempster, Diotima		Zhang, Zhao	
		Zuo, Wangda	✓

ADDITIONAL ATTENDANCE

Adams, Eric	Habenszus, Mladen	Lane, Loyko	Sharma, Chandan
Chen, Chun	Hoi, Nathan	Li, Sweii	Shi, Bingbing
Cook, Malcolm	Jin, Mingang	Lin, Xingbin	Sleitii, Ahmad
DeGraw, Jason	Kang, Kai	Meng, Lingjun	Waring, Michael
Djunaedy, Ery	Karava, Panagiota	Passe, Ulrike	Zhang, Li
Dungi, Santosh Roopak	Koupriyanov, Mike	Sam, Martin	Zhang, Yuanhui
Ghia, Urmila			

Society Liaisons, etc.

PRESENT

LeViseur, Suzanne	TAC Section Head		
Meredith, David	Prof. Devt. Committee		
Henderson, Hugh	Research Liaison		
Reeves, George	Standards Liaison		
Hosni, Mo	Program Liaison	✓	
Bahnfleth, William	TAC Chairman		
Ferguson, Kimball	Special Publications Liaison		
Ramspeck, Claire	Staff Liaison (Standards)		
Gulledge, Charles E.	TEGA Liaison		
Vaughn, Michael	Staff Liaison (Research)		
Aswegan, James	Handbook Liason	✓	
Bilderbeck, Mike	TAC Section 4 Head	✓	

Call to order - Chairman: (Jim VanGilder) at 2:15 p.m.

Welcome and Introductions (Chair Chao-Hsin Lin)

Roll call (Atila Novoselac in name of Leon Wang) – voting members

VanGilder, Jim	yes	Horstman, Ray	no
Chen, Qingyan (Yan)	yes	Srebric, Jelena	yes
Kato, Shinsuke (Intl.)	yes	Sanchez, Greg	no
Bennett, Jamie	yes	Zhang, Yuanhui	no
Lin, Chengxian (Charlie)	yes	Greg Dobbs	no
Musser, Amy	yes	Wang, Liangzhu (Leon)	no
Dols, Stuart	no	Banks, David	yes

8//14 voting members. Quorum achieved.
(Chair, Jim VanGilder, will vote for quorum)

Non-voting officers present: Atila Novoselac (Secretary)

Approval of last meeting minutes – vote to approve: 8-0-0-8

Announcements (Jim VanGilder)

At chairs' breakfast (Jim VanGilder):

- Mike Bilderbeck is Section Head for TC4.10 now replacing Walter Grondzik
- Websites are open for San Antonio 2012 and Dallas 2013.
- ASHRAE conference registration fees
 - Starting in Dallas 2013. Speakers will pay a small fee, perhaps \$100 (25% of normal registration). However, standard conference registration will drop to about \$450. From about \$650. Also trying to spread out costs across all of ASHRAE rather than have only attendee registration cover entire cost of meetings.
- Program
 - As with Montreal, one Track (a “mini conference”) is running primarily Sunday and Monday. The Chicago meeting mini-conference track is “Installation, Operation and Maintenance of HVAC Systems”.
 - Though we have been having trouble getting programs accepted in the era of the “Tracks”, TC4.10 was in the top 20 out of 100 or so TCs in total number of sessions on the program over the last 8 meetings.
 - Currently, when submitting a program, you are asked to assign a responsible TC. Now, the relevant TC Chair and Program Subcommittee Chair will be informed and given the opportunity to accept or reject this responsibility.
 - CEC would like each TC to keep a list of willing reviewers. For now we can email list to Tony Giometti but may also post on our web site. (There was also some discussion about possibly creating a form or using the roster.)
 - Starting in Dallas we can submit an entire Technical or Conference Paper session in addition to submitting papers individually. This is essentially a return to the system we had a few years ago with “Transaction” papers.

Technical Committee 4.10 – Indoor Environmental Modeling

- New Speaker Evaluation procedure is being implemented in Chicago. Speakers receiving a score below 3.5 will receive a letter advising that subsequent scores must be improved. The third low-score rating will require that the presenter take a speaker training. No specific training program is mandated at this point but CEC is open to web-based courses, private courses, in speaker's hometown, etc.
- There will be a Program Subcommittee Chair training session in the Speakers lounge on Tuesday at 11:15.
- San Antonio
 - Track 6 – Indoor Environmental Applications (Chair: Robert Baker)
 - Seminar and Forum proposals due February 13
 - A low number of conference papers were submitted for San Antonio so there are more open slots than normal for Seminars and Forums.
- CEC is looking for Track ideas for Denver (summer 2013) and New York (Winter 2014)
- Rebranding of ASHRAE
 - A new ASHRAE logo and tagline “Shaping Tomorrow’s Built Environment Today” was unveiled in Chicago. We need to update our website accordingly; ASRAE will contact each TC webmaster.
- Everyone can check their ASHRAE TC memberships and view rosters
- New “Help Wanted” section on ASHRAE web site under “Technical Committee”. TCs can use this to call for new members, recruit reviewers, handbook authors, equipment donations, etc.
 - www.ashrea.com ->Manage Your Membership->Biographical Record System->Bio Info->My Committees->Roster
- Reminder that TC members cannot speak on behalf of a TC without an approved TC position statement.
- ASHRAE will organize conference calls and web meetings. Requests go to Mike Vaughn at MORTS@ashrae.net.
- There are a number of upcoming conferences our members might be interested in. You can see of ASHRAE sponsored and endorsed events at <http://ashrae.org/membership--conferences/conferences>
- Honors/Awards
 - 2011-2012 Hightower Award Recipient: Don Beaty of TC9.9. (Hightower award is “...to recognize an individual for his/her excellence in volunteer service...”)
 - New ASHRAE Fellows: Xudong Yang of Tsinghua University and Jianshun Zhang of Syracuse University.

Comments / discussion / additional announcements

- Large discussion about future Speakers Fee. Majority of TC 4.10 members disapprove this action. There were many opinions that that this fee will reduce the quality and or diversity of speakers. However, several meeting participants pointed out that this is fee is not large when compared to other conferences.
- Mo Hosni pointed out seminar 17 in the ASRAE's Chicago program.

Membership (Jim VanGilder in name of Leon Wang)

- Changes in voting membership since Summer 2011 Meeting:
 - Rolled of: Ez Khalifa, Julian Rimmer, Walt Schwarz, Don Yang
 - Rolled on: Leon Wang, Greg Dobbs, Greg Sanchez, Dave Banks, Jim Van Gilder, Stuart Dolls, Ray Horstman, Jamie Bennett
- Changes in officers since Summer 2011 Meeting:
 - Roiled off Chair Chao-Hsin Lin
 - Vice Chair Jim VanGilder become Chair
 - Secretary Jamie Bennett become Vice Chair
 - Membership Chair Atila Novoselac become Secretary
 - Leon Wang become Membership Chair

Research (Jelena Srebric)

The research subcommittee met on Sunday (01/22) at 5:30-6:30 pm. There were 17 attendees in the meeting. Revolving submission deadlines: May 15th, August 15th, and December 15th.

- Current RP reports
 - PMS of RP 1512 (CFD resources for particle modeling) meet on Sunday from 2:30-3:30. The PMS chair Jamie Bennett reported on the project progress. To get more time for finishing modeling by LES, the project PI asked for no cost extension. TC 4.10 voted positive on the request and approved the 8-moths no cost extension.

Vote to approve no cost extension for RP 1512: 8-0-0-8

- PMS of RP 1487 (Rack Boundary Conditions) recommended to accept the report. TC 4.10 voted positive on RP PMS recommendation and the report is accepted.

Vote to approve RP 1487: 8-0-0-8

- The new RP 1458-TRP (Modeling Person-to-Person Contaminant Transport in a Mechanically Ventilated Room).Started on January 1. PMS chair Julian Rimmer meet briefly with PI Yan Chen as the project has just started.
- Work Statements:
 - None at this time.
- Current RTAR:
 - 1562-RTAR (Development of Boundary Models for Particulate Matters Deposition at Solid Surfaces of Indoor Environment). ASHRAE requested minor revision and Wangda Zuo will coordinate work needed to address this revision till May 15th deadline.
- New RTARs:
 - CFD Boundary Conditions for Natural Ventilation (time varying boundary conditions, validation with measured data). Malcolm Cook and Panagiota Karava will prepare a new RTAR for May 15th deadline.
 - Jim Van Gilder is preparing an RTAR on data center mock-up for experiments and validation benchmarks.
 - Michael Waring volunteered to prepare an RTAR on Modeling Surface Sorption.

Technical Committee 4.10 – Indoor Environmental Modeling

- Co-sponsored projects:
 - Lane Loyko from TC 10.3 proposed visited TC 4.10 to provide further clarification on potential collaboration between TC 4.10 and 10.3 related to the modeling of hydraulic hammer effect in pipelines (compressible flow). Individual members of TC4.10 will work with Lane Loyko on developing further this collaboration.

Current Status of TC 4.10 RTARs, WSs, and Projects.

Projects	PMS	Title	Status
1512-RP	Jamie Bennett PMS Chair	CFD Resource Decisions in Particle Transport Modeling, PI: Atila Novoselac The project officially started on August 1, 2010 Project end date is May 31, 2012	PI has made the project presentation and requested an eight month no cost extension
1458-RP	Julian Rimmer PMS Chair	Modeling Person-to-Person Contaminant Transport in a Mechanically Ventilated Room, PI: Yan Chen The project officially started on January 1, 2012 Project end date is December 31, 2013	PMS has briefly met as the project has just started
Bidding			
none			
WSs			
none			
RTARs			
1562-RTAR	Wangda Zuo	Development of Boundary Models for Particulate Matters Deposition at Solid Surfaces of Indoor Environment	Revision in preparations for May 15 th deadline
New	Malcolm Cook (Panagiota Karava)	Guidelines for the Accurate Use of CFD for Modeling Naturally Ventilated Indoor Spaces	RTAR in preparations for May 15 th deadline
New	Jim Van Gilder	Experimental Benchmark Data for Data Center Numerical Modeling	RTAR in preparations for May 15 th deadline
New	Michael Waring	Modeling Surface Sorption	RTAR in preparations for May 15 th deadline
Co-Sponsor			
none			

List of recently finished projects by TC 4.10

- 1487-RP “Developing Rack Boundary Conditions for CFD Modeling,” PI: John Zhai, January 2012
- 1321-RP “Modeling VOC Sorption of Building Materials and Its Impact on Indoor Air Quality - Phase II (second phase of RP-1097),” PI: Xudong Yang, April 2010
- 1271-RP “Modeling Low Velocity Large Scale Fluctuating Flows in Ventilated Spaces at Transitional Reynolds Numbers,” PI: Yan Chen, July 2009

During the meeting, the research Liaison for section pointed out that for ASHRAE 1321-RP project completion is still missing. Jelena Srebric will submit this form in name of PMS chair Gemma Kerr.

Suggestion is to check if these forms are received by ASHRAE for other finished RPs.

Handbook (David Banks)

The handbook research subcommittee met on Sunday (01/22) at 4:30-5:00 pm, and the major discussion was about the two handbook changes.

- There is a suggestion to include abstract of the TC sponsored projects into the ASHRAE handbooks. This can be done retroactively in the online version of the handbook since it can be updated anytime.
- Second discussion was about the paper version of the handbook. Even though it may look outdated, the paper version of the handbooks is high priority to ASHRAE. Members of many foreign ASHRAE chapters like to paper copies and the cost of printing is \$2.

David calls a vote to approve the latest version of the ASHRAE handbook section on CFD modeling.

Vote to approve: 8-0-0-8

Program (Mike Koupriyanov in name of Julian Rimmer)

The Program Subcommittee met Sunday, 1/30/11, from 3:30-4:30p.

- Chicago Program (conference in progress)
 - Relevant program during the Chicago conference
 - Basics of Computational Fluid Dynamics (CFD) for the Built Environment
 - Cutting-Edge Japanese Technologies, Part 2: 2011 SHASE Annual Award and Development of CFD on the Basis of BIM

Current Status of TC 4.10 Program

○ ASHRAE San-Antonio, Summer 2012			
Session Type	Session Title	Session Chair	Contributing Authors
Seminar	Boundary Conditions for Indoor Environmental Modeling	Mike Koupriyanov	John Zhai Mike Koupriyanov Yan Chen Atila Novoselac
Seminar	Coupling Indoor & Outdoor Environments	Jim VanGilder	Yan Chen Leon Wang Dave Banks Atila Novoselac Julian Rimmer
Seminar	Modeling Transients	Amy Musser	Simon Zhang Mike Koupriyanov Atila Novoselac
Seminar	Particle Transport	Wangda Zuo	Atila Novoselac Ezzat Khalifa

ASHRAE Dallas, Winter 2013			
Session Type	Session Title	Session Chair	Contributing Authors
Conference Paper	Modeling Thermal Comfort in the Indoor Environment	Julian Rimmer	Panagiota Karava Ray Horstman Mike Koupriyanov Malcolm Cook
Conference Paper	CFD in Healthcare	Isabelle Lavedrine	Julian Rimmer Isabelle Lavedrine

Technical Committee 4.10 – Indoor Environmental Modeling

			John Zhai
Conference Paper	Air/Contaminant Flow in Personal Microenvironment and PV Systems	Ezzat Khalifa	Ezzat Khalifa Shinsuke Kato Ed Arens (CBE)
Seminar	Airflow Modeling for LEED/Sustainable Design of Theatres, Stadiums, Arenas or Airports	Simon Zhang	Mike Koupriyanov Julian Rimmer Isabelle Lavedrine Greg Sanchez Ray Sinclair
Seminar	Modeling Industrial Spaces	Chao-Hsin Lin	Yan Chen Mike Koupriyanov Jamie Bennet
Seminar	Reduced Order Modeling	Jim VanGilder	Mingang Jin Jim VanGilder Xudong Yang

ASHRAE Denver, Summer 2013			
Session Type	Session Title	Session Chair	Contributing Authors
Seminar	Natural Ventilation	Shaun Fitzgerald	Shaun Fitzgerald Malcolm Cook David Banks Atila Novoselac
Seminar	Airflow Modeling on the Cheap (Open Source etc)	Jim VanGilder	Isabelle Lavedrine James McNeil Leon Wang
Seminar	Data Centers	Jim VanGilder	Shaun Fitzgerald Malcolm Cook David Banks Atila Novoselac John Zhai Ezzat Khalifa

There was a discussion about ASHRAE's special track procedure. Mo Hosni pointed out that for the summer meeting in San Antonio ASHRAE will add many special tracks. There were several suggestions to use special track procedure for the seminar on particle with Wangda Zuo as a chair.

Standards/Guidelines (Stuart Dols absent).

No discussion.

Web site activity (Stuart Dols absent):

No discussion.

Report of relevant activities in other TCs

- TC1.2 *Instruments and Measurements* - Arsen Melikov
- TC2.1 *Physiology and Human Environment* - Diotima Von Kempster
- TC2.3 *Gaseous Air Contaminants/Removal Equipment* - Gemma Kerr
- TC2.4 *Particulate Air Contaminants/Removal Equipment* - Dave Ensor
- TC4.3 *Ventilation Requirements and Infiltration* – Leon Wang
- TC5.3 *Room Air Distribution* - John Jenssen
- TC5.6 *Control of Fire and Smoke* – Kai Kang
- TC5.8 *Industrial Ventilation* –Jamie Bennett
- TC9.3 *Transportation* - Ray Horstman

Technical Committee 4.10 – Indoor Environmental Modeling

TC9.6 *Healthcare Facilities* – James Mcneil
TC9.9 *Mission Critical Facilities* – Jim VanGilder

Honors and Awards (Ray Horstman absent)

ChaoHsin Lin pointed out his and Ray's efforts to establishing a CFD vendor award.

New Business

Lane Loyko from TC 10.3 presented the problem on modeling a hammer effect in pipelines.

Agenda Suggestions for Next Meeting same

Vote to adjourn, 8-0-0-8, at 4:15 pm.

APPENDIX A: DESCRIPTION OF TC'S SCOPE (FROM WEBSITE)

TC 4.10 is concerned with developing, evaluating and recommending procedures for predicting indoor environmental conditions including thermal, acoustical, illumination, and air quality for new or existing buildings.