



## **ASHRAE Technical Committee 1.4**

### **ASHRAE TC 1.4 Control Theory and Application Meeting Minutes Chicago Winter Meeting January 27, 2015**

**These minutes were voted on and approved at the Atlanta Summer Meeting  
June 30, 2015.**



## ASHRAE Technical Committee 1.4

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.  
1791 Tullie Circle, N.E./Atlanta, GA 30329  
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.: 1.4

TC/TG/TRG TITLE: Control Theory and Applications

DATE OF MEETING: January 27, 2015 LOCATION: Chicago, IL

#### **DISTRIBUTION:**

ALL MEMBERS OF TC

ALL COMMITTEE LIAISONS



# ASHRAE Technical Committee 1.4

## TC/TG/TRG Activity Feedback Form

CELLS THAT NEED TO BE FILLED IN BY THE TC CHAIR ARE HIGHLIGHTED IN GREY WITH BOLD FONT.

Include activities performed since the last TC meeting (e.g. any letter ballots, submissions to RAC, award nominations, etc.)

**PLEASE DO NOT LEAVE NUMERIC CELLS EMPTY. ENTER 0 IN CELLS IF THERE IS NO COUNT.**

TC#	1.4		Committee Name:	CONTROL THEORY AND APPLICATIONS						
			Chair:	CHAD MOORE						
Meeting was Held (City)	CHICAGO		(Day)	TUESDAY		(Date)	1/27/2015			
<b>Membership</b>										
			Quorum Established (Yes/No)		YES					
			Number Present	Remote Participants	Total on Committee Roster					
Voting Members (excluding Non-Quorum Members)			7	0	8					
Non-Quorum Members			0	0	0					
Corresponding Members			20	0	60					
Provisional Members			4	0	17					
Visitors/Guests			35	0	n/a					
All members/guests who are ALSO YEA members			5	0	n/a					
<b>Handbook Responsibilities</b>										
Total Number of Chapters			2		Total Number of Standards					
# Chapters voted out this meeting			0		# Standards recommended					
Special Publications (last six months)			0		Title:					
<b>Program Activities (For This Meeting)</b>										
Total # of Forums			Total # of Seminars			Total # of Paper Sessions		Other Presentations		
Submitted*	Sponsor	Co-sponsor	Submitted*	Sponsor	Co-Sponsor	Submitted*	Sponsor	Co-Sponsor	TC Research Results	Other Papers**
0	0	0	5	4	0	0	0	0	0	0
<b>Current Research Activities (active)</b>								<b>TC Management</b>		
# of new/revised RTARs submitted			0			Minutes completed on time?			YES	
# of other active RTARs			0			Agenda distributed on time?			YES	
# of Work Statements submitted			2			Did Chair attend training?			YES	
# of other active Work Statements			2			Did Vice Chair attend?			YES	
# of active TRPs			0			Did Program Chair attend training?			YES	
# of active RPs			2			Did Handbook Chair attend training?			YES	
Problems getting RTAR/WS approved?			NO			Did Research Chair attend breakfast?			YES	
<b>Other Technical Activities</b>								<b>Award Nominations (last six months)</b>		
# FAQs updated this meeting			5			# of Distinguished Service Nominations			0	
# New members added to roster			15			# of Exceptional Service Nominations			0	
						# of Other Nominations: Hightower, Research, Fellow, etc			0	
						Specify Award:				
<b>Any Concerns or requests for the Technical Activities Committee? (Please type in Space Below)</b>										
Seminar 7: Controlling a Minimum Impact Data Center										
Seminar 43: Ventilation Research										
Seminar 57: Energy and Water Efficient Systems? Impossible Without Controls										
Seminar (Basic): Three Emerging Technologies in Building Automation										



# ASHRAE Technical Committee 1.4

## Meeting Minutes

TC 1.4 Control Theory and Application

<http://tc14.ashraetcs.org/>

Tuesday, January 27, 2015 1:00 – 3:30 pm

Palmer House Hilton

Chicago, IL

TC1.4 Control Theory & Application	Tuesday 1:00-3:30p	Empire Ballroom (Lobby)
TC 1.4 Control Components and Applications	Sunday 3:00-4:00p	LaSalle 2
TC 1.4 YEA	Sunday 4:00-4:30p	LaSalle 2
TC 1.4 Education	Sunday 4:30-5:30p	LaSalle 2
TC 1.4 Program	Sunday 5:30-7:00p	LaSalle 2
TC 1.4 RP-1455 PMS	Monday 9:00-10:00a	Sandburg 6
TC 1.4 Research	Monday 2:15-4:15p	Clark 10
TC 1.4 Handbook	Monday 4:15-6:30p	Clark 10
TC 1.4 Executive	Tuesday 7:00-8:00a	Burnham 3
TC 1.4 RP 1597 PMS	Tuesday 10:00-11:00a	Burnham 3
<i>Seminar 7: Controlling a Minimum Impact Data Center</i>	Sunday 9:45-10:45a	State Ballroom
<i>Seminar 43: Ventilation Research</i>	Tuesday 9:45-11:45a	Honore Ballroom (Lobby)
<i>Seminar (Basic): Three Emerging Technologies in Building Automation</i>	Tuesday 1:00-1:30p	Empire Ballroom (Lobby)
<i>Seminar 57: Energy and Water Efficient Systems? Impossible Without Controls!</i>	Wednesday 9:45-10:45a	Monroe Room

### 1) Call to Order

1:45pm call to order.

### 2) Introduce Members, Guests, and Liaisons

#### Research Liaison:

Art Giesler is asking for potential participants in the RAP committee. Need names if interested by March 1, 2015.

Atlanta will be Art's last time for Research Liaison for Section 1.

### 3) Present scope of TC 1.4

- a) ASHRAE Technical Committee 1.4 is concerned with control theory, systems, and components (excluding refrigerant flow controls) for heating, ventilating, air conditioning, and refrigeration uses.



## ASHRAE Technical Committee 1.4

### 4) Approve agenda

Chad Moore moved to approve current agenda. Barry Bridges seconded. Vote 6-0-0. Approved.

### 5) Approve minutes from previous meeting

Mike Pouchak moved for approval of Seattle Annual Meeting minutes. Kimberly Barker seconded the motion. Vote 6-0-0. Approved.

### 6) Announcements

#### a) Section Meeting announcements

Nadar “Jay” Jayaraman is new TC Section 1 Head.

- b) TAC
- c) RAC
- d) YEA

See notes under project committees below and attached YEA minutes.

### 7) OLD BUSINESS

#### A) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

##### i) SSPC 135 (BACnet) –

Still working on Tags.

##### ii) SGPC 13 (Specifying DDC Systems) – Chariti Young

This is out for public review. No comments. Public review went quickly and very well. It includes upgraded Networking, Integrations and Facilities Management. There are all sorts of disparate systems. Now document is becoming a very usable tool.

##### iii) GPC 36 (High Performance Sequences of Operation for HVAC Systems) – Mark Hydeman

Results from RP-1455 were sent for Advisory Public Review. Hopefully it will serve to stimulate discussion. Purpose is to get as much input from as many as possible. Also there is an ASHRAE Journal article that hopefully can be coordinated with this.

##### iv) RP-1455 (Advanced Control Sequences for HVAC Systems) - Michael Pouchak



## ASHRAE Technical Committee 1.4

Report is final. Still DDC is powerful but very much under-utilized. The intent is to maximize DDC capabilities to fullest extent possible with this project.

- v) RP-1597 (Stochastic Control Optimization of Mixed-Mode Buildings) – Kim Barker

**This research project is complete.**

- vi) RP-1633 (Data & Interfaces for Adv. Building Maintenance & Operation) – Reinhardt Seidl

**This research project is complete.**

- vii) 1587-TRP (Control Loop Performance Assessment) – Steve Taylor

**Steve conveyed the contractors are asking for no-cost extension through annual meeting this summer. Motion to approve, seconded. Vote 6-0-0. Motion approved.**

### a) SUB-COMMITTEE REPORTS

- i) Executive – Chad Moore

**Committee is in great shape. We have lots of programs and research projects in the queue.**

**Executive committee proposes to move YEA meeting to 2:30pm on Sundays. The reason is that YEA members are pressed for time at the current timeslot due to next commitment (reception).**

- ii) Control Components and Applications – Barry Bridges

**See subcommittee minutes for details.**

**Highlights: New sensors being talked about (microbial) that will allow microbe levels to be used for DCV in hospitals and critical care facilities.**

**Jim Coogan spoke briefly on this subject as a comment from Len Damiano. Perhaps put a reference to Guideline 36 on standard sequence information regarding DCV.**

**Another topic was to look at other methods of determining occupancy. Steve Taylor mentioned that RP-1455 calls out detailed control sequences on DCV (according to California standards).**



## ASHRAE Technical Committee 1.4

### iii) Program – Frank Shadpour

See subcommittee minutes for details.

In Chicago TC 1.4 presented 4 programs. This meeting we presented on “Three Emerging Technologies in Building Automation” just prior to our main meeting. Frank requests feedback from the members on this presentation. The hope is to do the same thing in Atlanta. But we need to get information to Frank by February 9.

It was a very interactive subcommittee meeting. 7 programs will be submitted for Atlanta.

Chariti gave a quick talk on upcoming program tomorrow. Seminar 57: “Energy and Water Efficient Systems? Impossible Without Controls!”. Presentations will be by Gaylen Atkinson and John Fordemwalt.

Chariti mentioned that Guideline 36 committee (Mark Hydeman) may be requesting another program for Atlanta.

Effective the Orlando meeting, strikes will be given if programs are not submitted on time.

A motion to approve programs as proposed. Vote 6-0-0. Motion approved.

### iv) Education – Marcelo Acosta

See subcommittee minutes for details.

The intent is to request for special ASHRAE publication to define minimum required competencies for the Building Automation Control Professional.

Also, maybe we should point to where base competencies can be attained through online education?

Question from Jeff Stein: “What type of controls professional are we talking about, design engineer, controls engineer, controls technician?”

Answer from Marcelo: Maybe a subset of the main competencies that would be discipline specific (ie. design engineer, controls contractor, building engineer, etc.)

### v) YEA – Joseph Kilcoyne

See subcommittee minutes for details.

Two YEA regional coordinators attended.



## ASHRAE Technical Committee 1.4

Not many YEA members attend national meeting and few of them understand the TCs and what role they play.

Joe is proposing to create presentation on the structure of ASHRAE TCs and ask members to present to their local chapter meetings to gain interest and support at the local chapter level. For example, "What are TCs and how do I become involved?"

Carol Delmonico suggested to possibly do a presentation for the local chapters just prior to the national meeting in the given area to generate interest. Also, possibly in Atlanta this summer have a special YEA tour at ASHRAE headquarters.

vi) Handbook – Dave Kahn

See subcommittee minutes for details.

Atlanta meeting is timeline for submitting Fundamentals Chapter 7 handbook draft to ASHRAE. Prior to end of May this year, the final draft will be circulated to the TC members for their perusal prior to submission to ASHRAE.

We are now working with TC6.1 handbook valve section coordinator. TC1.4 is very grateful to be involved with giving feedback to TC6.1.

vii) Research – Kim Barker

See subcommittee minutes for details.

Steve Taylor conducted this meeting in Chicago. Kimberly Barker will take over as research subcommittee chair after this meeting.

Steve outlined the status of Research Projects and proposals as of this date.

Lots of good ideas were thrown out on possible subjects at the research subcommittee meeting that are detailed in the Research minutes attached.

viii) Standards – Steve Taylor

Nothing on standards per Steve.

However on 90.1 there was an addendum on requiring DDC. This was not in there prior to now. However the sequences would have required DDC to accomplish anyway, so the addendum will now simply mandate the need for DDC.





## ASHRAE Technical Committee 1.4

- ix) Webmaster – Garry Cole
- b) Committee Liaison Reports
  - i) TC 1.5 (Computer Applications) – Mike Pouchak

Basecamp is a program that Mike mentions that may be worth our consideration.
  - ii) TG 2 HVAC Security – Kim Barker

Carol Delmonaco gave an update. There is a new chair (Jason) as Anthony is rolling off.

Possibly an RTAR is required to develop what guidelines there should be for HVAC security.

There were lots of interaction and chatter at the HVAC Security meeting with robust debate.

Kim mentioned a discussion on how much and what type of security is needed possibly templated based on building type.
  - iii) TC 5.6 (Control of Fire & Smoke) –

No liaison present.
  - iv) TC 6.1 (Hydronic Systems) – Dave Kahn

Some talk about the possibility of co-sponsoring a program with the TC.
  - v) TC 6.7 (Solar Energy Utilization) – Gaylen Atkinson

No update as Gaylen had to leave for another TC meeting that coincides with this one which he is also a member and his vote is needed to achieve quorum.
  - vi) TC 7.3 (Operations & Maintenance Management)

A moment of silence was given for the late Dr. Angela Lewis. May she rest in peace.
  - vii) TC 7.5 (Smart Building Systems) –John House

The TC is working on a standard for a lab method of test for FDD (fault detection diagnostics) to commercial air cooled packaged HVAC systems.



## ASHRAE Technical Committee 1.4

Good progress being made. They would like to put out an Advisory Public Review. However there is some apprehension on not having tested the FDD tool.

At the next meeting they want to brainstorm for a road mapping session.

FDD, Smart Grid, Emerging Technologies, etc.

- viii) TC 7.6 (Systems Energy Utilization)

No liaison present.

- ix) TC 7.9 (Building Commissioning) – David Bornside

Guideline 202 is new standard for commissioning.  
Guideline 0.2 is now updated as well.

- x) TC 9.10 (Laboratory Systems) – Jim Coogan

The TC is working on the guideline – almost done. A new subcommittee on Energy Efficiency has been created.

- xi) TC 9.11 (Clean Rooms) – Jim Coogan

A New Energy Efficiency subcommittee has been created for this TC as well.

- xii) SSPC 62.1 (Ventilation and Acceptable IAQ) – Len Damiano

Len said he had nothing of significance at this time to report.

- xiii) SSPC 90.1 (Energy Efficient Design of New Buildings) – Steve Taylor

Nothing to report.

- xiv) TC 1.6 (Terminology) – David Bornside

One can now search on ASHRAETERMS. It is on the website, google ASHRAETERMS.

- xv) SGPC 0.2 & 1.2 (The Commissioning Process) – David Bornside

See above comments on TC 7.9. 202 is the new standard.

- xvi) SPC134 (Graphic symbols for HVAC systems) – David Bornside

Desperately looking for someone to take the document and provide updates to it. 3D symbols are needed as well as updates to 2D symbols.



## ASHRAE Technical Committee 1.4

- xvii) US TAG to ISO/TC 205 (Building Environmental Design)

**No liaison present.**

- xviii) SPC 189 Design of High Performance Building – Bogi Setty

**No liaison present.**

- xix) MTG.EAS – Energy-Efficient Air Handling Systems for Non-Residential Building: – Len Damiano.

**This has been resolved. Remove from minutes prior to next meeting.**

- c) Society Committees

**GPC-11 has been re-formed (field testing of HVAC devices and controls).**

### 8) New business

- a) **BASEcamp is program being used by ASHRAE as a commentary data base and collaboration software. The TC may want to check into this.**

- b) Roster updates:

- i) TC Leadership rolling on after Seattle (6/16): Chad Moore (Chair), Garry Cole (Vice Chair)

- (1) New voting members rolling on after Atlanta:

**Joseph Kilcoyne, Ron Bernstein**

- (2) New corresponding members rolling on after Atlanta:

**Yan Chen, Heejin Cho**

**Need to have 3 more voting members for the TC to ensure quorum.**

### 9) Upcoming Deadlines

- a) For Atlanta June 27 – July 1, 2015

- i. Conference Paper accept/reject notifications sent January 30, 2015
  - ii. Seminar, Forum and Workshop Proposals Due on February 9, 2015
  - iii. Revised Conference Papers/Final Technical Papers due February 13, 2015
  - iv. Conference and Technical Paper Final Accept/Reject Notifications sent Feb. 27, 2015
  - v. Seminar, Forum, Workshop Accept/Reject Notifications sent March 23, 2015



## ASHRAE Technical Committee 1.4

- vi. All PPTs Due Online by June 5, 2015
- vii. Final Day for Commercialism Revision Upload prior to on-site by June 17, 2015
- viii. Speaker's Lounge Opens on June 27, 2015
- ix. Conference Website: <http://www.ashrae.org/atlanta/>

### b) Atlanta Conference Tracks

- Systems and Equipment
- Fundamentals and Applications
- Research Summit
- Refrigeration
- Building Operation, Maintenance and Optimization/Commissioning
- Indoor Air Quality
- Modeling throughout the Building Life Cycle
- High Performance Buildings
- Moving Advanced Energy Design Guidance to the Mainstream

### 10) Next Meeting – Atlanta, GA June 27 – July 1, 2015

### 11) Adjourn

3:25PM.



## ASHRAE Technical Committee 1.4

### Technical Committee 1.4, Control Theory and Application

TC 1.4 is concerned with control theory, systems, and components (excluding refrigerant flow controls), for heating, ventilating, air conditioning and refrigeration uses.

### ASHRAE Code Of Ethics

(Approved by ASHRAE Board of Directors January 30, 2013)

As members of ASHRAE or participants in ASHRAE committees, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct.

- A. Efforts of the Society, its members, and its bodies shall be directed at all times to enhancing the public health, safety and welfare.
- B. Members and organized bodies of the Society shall be good stewards of the world's resources including energy, natural, human and financial resources.
- C. Our products and services shall be offered only in areas where our competence and expertise can satisfy the public need.
- D. We shall act with care and competence in all activities, using and developing up-to-date knowledge and skills.
- E. We shall avoid real or perceived conflicts of interest whenever possible, and disclose them to affected parties when they do exist.
- F. The confidentiality of business affairs, proprietary information, intellectual property, procedures, and restricted Society discussions and materials shall be respected.
- G. Each member is expected and encouraged to be committed to the code of ethics of his or her own professional or trade association in their nation and area of work.
- H. Activities crossing national and cultural boundaries shall respect the ethical codes of the seat of the principal activity.



## ASHRAE Technical Committee 1.4

### Applying for Membership on a Technical Committee

*ASHRAE welcomes new members to its technical committees.*

To be considered for technical committee membership, you must:

Notify ASHRAE staff at [TCStaff@ashrae.net](mailto:TCStaff@ashrae.net) of your interest in a particular TC, TG, TRG, or MTG.

You will immediately be assigned as a Provisional Corresponding Member,

The acceptance of provisional corresponding membership implies participation in committee activities through correspondence or in-person involvement.

Provisional corresponding members serve 2 year terms.

Although provisional corresponding members are not voting members, at the end of your term and based on participation in the committee, you may be considered for future voting membership.

Notification of acceptance to a TC is emailed upon your appointment.



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 1 – TC 1.4 ATTENDANCE**



# ASHRAE Technical Committee 1.4

PLEASE SIGN AND RETURN TO CHAIR			Sun	Mon	Tues
Name	Position	Company	Components and Applications YEA/Education Programs Research Handbook Executive Breakfast Main Committee		
<b>Voting Members</b>					
Chad Moore	Member, Chair	Engineering Resource Group, Inc.			X X
Garry Cole	Member, Vice Chair	Belimo Americas	X X X	X X	X X
Gaylen Atkinson	Member	Atkinson Electronics Inc	X X X		X
Jeffrey Stein	Member	Taylor Engineering LLC		X X	X
Jim Coogan	Member	Siemens	X	X X	X
Kristopher Kinney	Member	ECT Building Automation			
Marcelo Acosta	Member, Chair Education	Armstrong	X X X	X X	X
Mike Pouchak	Member	Honeywell	X	X X X	X X
<b>Non-Voting Officers</b>					
Barry Bridges	Chair, Control Components	Sebesta Blomberg & Associates	X X X	X X	X X
Charles Coward	MTG.EAS, Alternate	Waddell Engineering	X		X
Dave Kahn	Chair, Handbook	RMH Group	X X X	X X	X X
Frank Shadpour	Chair, Programs	SC Engineers, Inc.	X X X	X	X X
Joseph Kilcoyne	Chair YEA	SC Engineers, Inc.	X X X		X
Kimberly Barker	Chair, Research	Siemens			X
Len Damiano	MTG.EAS, Liaison	Ebtron Inc			X
<b>Corresponding Members</b>					
Al Garza	CM	LNV			
Anthony Bruno	CM	Trane			
Boggarm Setty	CM	Setty & Associates Ltd			
Brent Eubanks	CM	Taylor Engineering			
Carol Lomonoco	CM	Johnson Controls Inc		X	X
Carol Qing Li	CM	Stantec			
Chariti Young	CM	Automated Logic Corp	X X X	X X	X
Christopher Frank Benson	CM	Total Building Commissioning			
Christopher Miller	CM	P2S Engineers Inc.			
Curtis Klaassen	CM	Energy Systems Engineering			
Darryl DeAngelis	CM	Belimo Americas			
David Bornside	CM	Siemens Building Technologies Inc			X
David Branson	CM	Compliance Services Group, Inc.			
David Underwood	CM	CERL	X	X	X
Dennis Stanke	CM				
Donald Hardin	CM	Enviromatic Systems			
Dr. Wangda Zuo	CM	University of Miami		X	
Gregor Henze	CM	Univ of Colorado, Boulder			
Gregory Dobbs	CM	Penn State Univ			
Heejin Cho, PhD	CM	Mississippi State University		X	X
James Gartner	CM	Four Seasons Environmental Inc			
Jim Tello	CM	San Diego Gas & Electric			
John Fordemwalt	CM	Baseline, Inc.			X
John House	CM	Johnson Controls Inc		X	X
John Kettler	CM	Kettler Control Consultants			X
John Zhou	CM	The Trane Company			
Kevin Kerr	CM	Skyline Automation			
Larry Felker	CM	Belimo Americas			
Larry Fisher	CM				
Lindell Davidson	CM	Professional Design Quality			
Mark Hydeman	CM	Taylor Engineering			
Mark Hydeman	CM	Taylor Engineering			
Mashuri Warren	CM	A S I Controls			
Michael Monahan	CM	Burns & McDonnell			
Michael Newman	CM	Cornell University			
Michael Schell	CM	AirTest Technologies			
Michael Wetter	CM	Lawrence Berkeley Lab			





## ASHRAE Technical Committee 1.4

PLEASE SIGN AND RETURN TO CHAIR			Sun		Mon		Tues		
			Components and Applications	YEA/Education	Programs	Research	Handbook	Executive Breakfast	Main Committee
Name	Position	Company							
Mike Gibson	CM	Pi Shape Incorporated							
Min Chien Tsai	CM	Alpha Tech							
Nemat Lotfi	CM	Eaton Industries							
Nicholas Gayeski	CM	KGS Buildings							
P Reid Hart	CM								
Pankaj Kalore	CM	Miller Electric							
Paul Wacker	CM	Honeywell							
Peter Armstrong	CM	Battelle/Pacific Northwest Nat'l Lab	X						
Philip Haves	CM	Lawrence Berkeley Lab				X			X
Raj Daswani	CM	Arup							
Reinhard Seidl	CM	Taylor Engineering				X			
Richard Franseen	CM	Honeywell Inc							
Robert Coleman	CM	Trane Company							
Ron Bernstein	CM	Ron Bernstein Consulting Group	X	X	X			X	X
Ryan Tanner	CM	C.U. Boulder							
Sean Graham	CM	DLB Associates							
Sharon Dinges	CM	Valent Air							
Shui Yuan	CM								
Steve Linn	CM	Siemens Infrastructure and Cities							
Steve Taylor	CM	Taylor Engineering				X			X
Steven Bushby	CM	NIST							
Steven McCloskey	CM								
Verle Williams	CM	Utility Services Unlimited Inc							X
Xiaohui (Joe) Zhou	CM	Iowa Energy Center ERS DMACC			X	X	X		X
Xinlei Wang	CM	University of Illinois							
Yan Chen	CM	Penn State	X	X		X			
Provisional Members									
Aaron Smith	PCM	M&R Engineering							
Brian Bozell	PCM	ESD							X
Charles A Miltiades	PCM	Mitsubishi Electric							
Daniel Rollins	PCM	Michael Baker International							
Dario Petric	PCM	WSP							
David John Pritchard	PCM	Arup							
Hailey Capps-Mick	PCM	IMI, plc							
Michael Phillips	PCM	Southland Industries							X
Shane Mason	PCM								
Zheng O'Neil, PHD	PCM	United Technologies Research				X			X
Guests									
Alejandro Nivas	Guest	University of Oklahoma	X						
Alexander Weiss	Chap Technical Chair	Alexander Weiss, PE							
Art Giesler	RLI	Permavent							X
Brandon Gill	Guest	Taylor Engineering				X			
Christopher Amundson	Guest	Johnson Controls							X
David Blum	Guest	MIT				X			
David Gastillo	Guest	State of California OSHPD	X						
Eric Rosenberg	Guest	Grumman/Butkus Associates							X
Eric Wilson	Guest	Harshaw Trane							X
Heather Schopplein	Guest	Haldeman		X					
Hui Shen	Guest					X	X		
Hywel Davies	Guest								X
James Del Monaco	Guest	P2S Engineering	X				X		
Jia Chang Huang	Guest	PG&E							X
Jin Wen	Guest	Drexel University				X			
Joe Bush	Guest	USACE	X						
Joe Carmody	Guest	Johnson Controls							



## ASHRAE Technical Committee 1.4

PLEASE SIGN AND RETURN TO CHAIR			Sun		Mon	Tues			
			Components and Applications	YEA/Education	Programs	Research	Handbook	Executive Breakfast	Main Committee
Name	Position	Company							
John Song	Guest	McGuire Engineers		X	X				
Joslyn Ratcliff	ASHRAE	ASHRAE Staff							
Kyle Whitaker	Guest	Mueller Refrigeration	X						
Liping Wang	Guest	University of Wyoming				X			
Mark Owen	Guest	ASHRAE Staff							
Michael Bobker	Guest	City University of NY	X						
Michael Phillips	Guest	Southland Industries							X
Mike Galler	Guest	NIST	X						
Ofer Pittel	Guest	Pittel Engineering	X						
Olmaseij Ogunsola	Guest	University of Oklahoma	X						
Pierre Laplante	Guest	Williams Engineering	X						
Ran Liu	Guest	Iowa Energy Center	X			X			
Will Maak	Guest	Cyclone Energy Group		X					
Xiangi Liu	Guest	Purdue University	X						
Zheng O'Neil	Guest	Univ. of Alabama				X			X



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 2 – TC 1.4 AGENDA**



## ASHRAE Technical Committee 1.4

### Agenda

TC 1.4 Control Theory and Application

<http://tc14.ashraetcs.org/>

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Chicago, IL

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<i>Seminar 57: Energy and Water Efficient Systems? Impossible Without Controls!</i>	Wednesday 9:45-10:45a	Monroe Room

#### 12) Call to Order

#### 13) Introduce Members, Guests, and Liaisons

#### 14) Present scope of TC 1.4

- a) ASHRAE Technical Committee 1.4 is concerned with control theory, systems, and components (excluding refrigerant flow controls) for heating, ventilating, air conditioning, and refrigeration uses.

#### 15) Approve agenda

#### 16) Approve minutes from previous meeting

#### 17) Announcements

- a) Section Meeting announcements
- b) TAC
- c) RAC
- d) YEA



## ASHRAE Technical Committee 1.4

### 18) OLD BUSINESS

#### A) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

- i) SSPC 135 (BACnet) –
- ii) SGPC 13 (Specifying DDC Systems) – Chariti Young
- iii) GPC 36 (High Performance Sequences of Operation for HVAC Systems) – Mark Hydeman
- iv) RP-1455 (Advanced Control Sequences for HVAC Systems) - Michael Pouchak
- v) RP-1597 (Stochastic Control Optimization of Mixed-Mode Buildings) – Kim Barker
- vi) RP-1633 (Data & Interfaces for Adv. Building Maintenance & Operation) – Reinhardt Seidl
- vii) 1587-TRP (Control Loop Performance Assessment) – Steve Taylor

#### d) SUB-COMMITTEE REPORTS

- i) Executive – Chad Moore
- ii) Control Components and Applications – Barry Bridges
- iii) Program – Frank Shadpour
- iv) Education – Marcelo Acosta
- v) YEA – Joseph Kilcoyne
- vi) Handbook – Dave Kahn



## ASHRAE Technical Committee 1.4

- vii) Research – Kim Barker
- viii) Standards – Steve Taylor
- ix) Webmaster – Garry Cole
- e) Committee Liaison Reports
  - i) TC 1.5 (Computer Applications) – Mike Pouchak
  - ii) TG 2 HVAC Security – Kim Barker
  - iii) TC 5.6 (Control of Fire & Smoke) –
  - iv) TC 6.1 (Hydronic Systems) – Dave Kahn
  - v) TC 6.7 (Solar Energy Utilization) – Gaylen Atkinson
  - vi) TC 7.3 (Operations & Maintenance Management)
  - vii) TC 7.5 (Smart Building Systems) –John House
  - viii) TC 7.6 (Systems Energy Utilization)
  - ix) TC 7.9 (Building Commissioning) – David Bornside
  - x) TC 9.10 (Laboratory Systems) – Jim Coogan
  - xi) TC 9.11 (Clean Rooms) – Jim Coogan
  - xii) SSPC 62.1 (Ventilation and Acceptable IAQ) – Len Damiano
  - xiii) SSPC 90.1 (Energy Efficient Design of New Buildings) – Steve Taylor



## ASHRAE Technical Committee 1.4

- xiv) TC 1.6 (Terminology) – David Bornside
  - xv) SGPC 0.2 & 1.2 (The Commissioning Process) – David Bornside
  - xvi) SPC134 (Graphic symbols for HVAC systems) – David Bornside
  - xvii) US TAG to ISO/TC 205 (Building Environmental Design)
  - xviii) SPC 189 Design of High Performance Building – Bogi Setty
  - xix) MTG.EAS – Energy-Efficient Air Handling Systems for Non-Residential Building: – Len Damiano.
- f) Society Committees

### 19) New business

- c) Roster updates:
- (1) TC Leadership rolling on after Chicago:
  - (2) New voting members rolling on after Chicago:
  - (3) New corresponding members rolling on after Chicago:

### 20) Upcoming Deadlines

- c) For Atlanta June 27 – July 1, 2015
- i. Conference Paper accept/reject notifications sent January 30, 2015
  - ii. Seminar, Forum and Workshop Proposals Due on February 9, 2015
  - iii. Revised Conference Papers/Final Technical Papers due February 13, 2015
  - iv. Conference and Technical Paper Final Accept/Reject Notifications sent Feb. 27, 2015
  - v. Seminar, Forum, Workshop Accept/Reject Notifications sent March 23, 2015
  - vi. All PPTs Due Online by June 5, 2015
  - vii. Final Day for Commercialism Revision Upload prior to on-site by June 17, 2015



## ASHRAE Technical Committee 1.4

- viii. Speaker's Lounge Opens on June 27, 2015
- ix. Conference Website: <http://www.ashrae.org/atlanta/>

### d) Atlanta Conference Tracks

- Systems and Equipment
- Fundamentals and Applications
- Research Summit
- Refrigeration
- Building Operation, Maintenance and Optimization/Commissioning
- Indoor Air Quality
- Modeling throughout the Building Life Cycle
- High Performance Buildings
- Moving Advanced Energy Design Guidance to the Mainstream

### 21) Next Meeting – Atlanta, GA June 27 – July 1, 2015

### 22) Adjourn





## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 3 – SSPC 135 REPORT**



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 4 – SGPC 13 MEETING MINUTES**



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 5 – TC 1.4 EXECUTIVE SUBCOMMITTEE MINUTES**



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 6 – TC 1.4 HANDBOOK SUBCOMMITTEE MINUTES**



## ASHRAE Technical Committee 1.4

### MINUTES

#### TC 1.4 Handbook Subcommittee

January 25, 2015 / 4:15 – 6:15  
Chicago Palmer House Clark 10 (7)

#### 1. CALL TO ORDER

#### 2. REPORT FROM FUNDAMENTALS HANDBOOK LIAISON

- 2.1. Bass Abushakara (Fundamentals Liaison Liaison)
- 2.2. Bass is unable to attend. Our submission deadline for the Fundamentals volume is July 5, 2015. TC 1.4 will vote at the Atlanta meeting to approve the chapter for publication.

#### 3. OLD BUSINESS

- 3.1. TC 1.4 responded to TC 6.1's request for review of the valve chapter. Several people submitted comments. 6.1 appreciates it and conveyed their thanks.

#### 4. NEW BUSINESS

- 4.1. The ASHRAE Handbook Online is now a free member benefit. There is no longer a n Online+ or a CD+ edition.
- 4.2. ASHRAE Terminology is a free online glossary. The Handbook should use the terms in the glossary, or add terms as needed. The link is [www.ashrae.org/ashraeterms](http://www.ashrae.org/ashraeterms)
- 4.3. Section Captains have sent in their marked sections that have been compiler into a new master. The sections are:
  - a. Introduction, Terminology, and Types of Control Action - **Barry Bridges**.
  - b. Classification by Energy Source, Control Components, Valves, Dampers, Pneumatic Pilot Positioners - **Garry Cole**.
  - c. Sensors and Transmitters, Temperature Sensors, Humidity Sensors, Pressure Transmitters, Flow Rate Sensors, IAQ Sensors, Lighting Level Sensors, Power Sensing, Controllers, up to but not including Other Auxiliary Control Devices - **Chad Moore**
  - d. Other Auxiliary Control Devices to up to but not including page 7.14 Communication Network Devices for BAS – **Marcelo Acosta**.
  - e. Communication Network Devices for BAS up to but not including Commissioning - **Chariti Young & Kim Barker**.
  - f. Commissioning to the end - **Chris Benson**
  - g. Overall Review Steve Taylor, Ryan Tanner, Dave Kahn, Marcelo Acosta, Kim Barker
- 4.4. The attendees reviewed and edited the work to date.
- 4.5. Section Captains will have their sections complete by May 15, 2015.



## ASHRAE Technical Committee 1.4

4.6. The final edits will be made and the working draft will be sent to TC 1.4 members for their review at the end of May. Any comments from TC members will be incorporated at the Handbook Subcommittee meeting in Atlanta. The TC will Vote in Atlanta relative to going forward with the chapter.

### 5. NEXT MEETING AND SCHEDULE

5.1. 4:15-6:30 Monday June 29, 2015 Annual meeting Atlanta

### 6. Adjourn

Adjourn at 6:30

### TC 1.4 Handbook Subcommittee Attendance List

Present	Name	
X	Chariti Young	
X	Dave Kahn	
	Kim Barker	
	Chad Moore	
	Ryan Tanner	
X	Garry Cole	
X	Marcelo Acosta	
X	Barry Bridges	
	Chris Benson	
X	Mike Poucheck	
X	James Del Monaco	
<b>Liaisons</b>		
	Chris Ahne	Applications Handbook Liaison
X	Bob Walker	Liaison from TC 6.1 Valves
	Bass Abushakara	Fundamentals Handbook Liaison



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 7 – CONTROL COMPONENTS AND APPLICATIONS SUBCOMMITTEE MINUTES**



## ASHRAE Technical Committee 1.4

### ASHRAE TC 1.4 Control Theory and Application

#### Sub-committee: Control Components and Applications

#### Meeting Minutes: Sunday 25 January 2015

Meeting: 1500-1600, Sub Committee Chair Barry Bridges

**SCOPE Includes:** Components (Sensors, Actuators, Controllers, OWS), Networks, Control Applications Loops, Building management reporting

**Components and Control Application “brainstorming session”** lets TC 1.4 members and guests talk openly about issues and hot topics without being subjected to budgets or due dates.

**Introductions Around the Room:** Those in attendance verbally around the room and written on the attendance form provided with Name, Business affiliation.

**Announcement:** The main meeting of the whole has a revised schedule to add three 10 minutes each presentations at its beginning. The intent is to provide our technical meeting with useful subject specific details. The speakers and topics include: Ron Bernstein BAS Dashboards, Dave Kahn wireless; Joe Kilcoyne Controls Integration.

#### Topics from 29 June 2014 were reviewed:

##### Irrigation

Control should consider all building subsystem not just energy the integration of irrigation into BAS is an example. Present surveys indicate that 58% of domestic water goes to landscapes and half of that is wasted. Control development includes monitoring moisture content and temperature of soil, air humidity and temperature to determine need for irrigation operation. To let water soak into soil a short pulse cycles on then off long enough to soak in before the next pulse. Real time pricing or ordinance restrictions are other criteria used to modify irrigation.

Integration of the irrigation control to BAS is possible through a gateway to BACnet for data monitoring and master control.

The June 2014 discussion became part of a program at the 2015 Winter Meeting in Chicago Seminar 57: “Energy and Water Efficient Systems? Impossible without Controls, Wednesday, 9:45 Monroe room.

**Microsoft Campus: Fault Detection and Diagnostic** Large Practical Application: organized by TC7.5: This was an open committee presentation by MS Facility Director, Darrell Smith. Automated-FDD is applied at MS to a 15M SF campus of 145 structures. This facility has a \$60 Million energy bill, and a BAS point count of 2M objects. This system includes the control and operation of lights, HVAC, monitoring of energy metering, communications, fire, security, elevators and others. Shown to be economical benefit even in smaller commercial buildings.





## ASHRAE Technical Committee 1.4

### NEW TOPICS

SSPC 62.1 requested input from TC 1.4 regarding ventilation Control on the Topics: Building controls and standard sequences of operation; DCV improvements, Inclusion of standard sequences of operation in the 62.1 User's Manual.

#### Comments from SSPC 62.1

These notes appended after the CCA adjourned: Jim Coogan attended the 62.1 meeting. He reported that the IAQ intention to include an OA control sequence are effectively covered by TC1.4 through the RP 1455 best of class control sequence of operation that addresses both 62.1 and 90.1 and a RP from TC 4.3 that involved DCV. Provide excerpts or references to 1.4 docs and intend to have closer relation to TC 1.4 for the application of 62.1 into controls and especially the GPC 36 advanced controls.

#### IAQ Discussion in the CCA Subcommittee meeting

Two strategies for IAQ include: 62.1.6.2 the prescriptive path, and 62.1.6.3 the performance path

In 62.1.6.2 the prescriptive path – identifies for different space types a ventilation rate for the area of the space and for that space type an additional ventilation rate for occupants in the space

CO<sub>2</sub> is measured as a surrogate for the occupancy portion of the required ventilation in a space.

The overall prescriptive philosophy is that the one time ventilation design and airflow rate when constructed will then, with variation for occupants even if the type of space use changes, be all that is required. No continuous measurement is needed, not even the total air volume actually delivered. Would a continuous measure of some contaminants be better?

In ASHRAE Standard 62.1.6.3 the performance path expects to have contaminant measurements made to prove a ventilation scheme works to provide acceptable IAQ, This is only required once to prove the design.

Those at the meeting discussed control implications for these two IAQ approaches to define what sensors and analysis are needed to provide active control for space ventilation.

Prescriptive Path Occupancy could be estimated without CO<sub>2</sub> measurement. Alternates include:

- a camera with face recognition that counts the number of occupants
- a more granular camera would identify bodies, but not the privacy issue of recognition
- dual door way motion detectors to count number of entry's and exits
- a security badge reader keeping track of who is in the space and who left,
- direct status of local devices like desk computers or task lighting
- Indirect indication of occupancy from increase in power from base load.



## ASHRAE Technical Committee 1.4

Does the placement of a CO<sub>2</sub> or other contaminant vary depending on the type of strategy for air circulation. Should a CO<sub>2</sub> sensor in a turbulent mixed air space be located in the breathing zone height on a wall or as a sampler hanging from the ceiling 4 feet above finished floor. Would the best place for measurement of CO<sub>2</sub> in a displacement based distribution be in the return air so to actually read CO<sub>2</sub> generated in the space. It would seem that in a displacement system the BZ level is the clean intake and just overhead is the actual reading.

Performance Path controls could be extended to be more than just CO<sub>2</sub> to be measured continuously. Why not figure out the Pareto 80/20, Heuristic, differential diagnostic histogram, best choice of 5-10 contaminants being continuously monitored that represents more than just the surrogate of measured CO<sub>2</sub> for occupancy.

This control strategy would not measure all possible contaminants, but in the same way the prescriptive path ventilation rate for a locker room is different from an office, so too would be the mix of contaminants to measure in real time.

Easier to measure contaminants like CO, or TVOC could be taken in more locations every minute, and tougher to measure contaminants like Formaldehyde, might have fewer sensors at lower frequency. Measured and combined the area estimated contaminant contribution would be used in addition to CO<sub>2</sub>, (or some other estimate of occupancy) to continuously revise space ventilation.

### **Magic Sensors and practical considerations**

The general discussion of air quality sensors brought out a comment that there are specialized sensors to detect infection in hospital rooms. These microbial sensors it is reported provide not only instant readings of microbes in the air but through DNA analysis identify what microbe it is. Microbial sensor technology for viral identification using dna analyzers is already on emergency response vehicles to measure pathogens and can determine if it is SARS, Ebola or others. This is in addition to continuous particulate sensing in operating suites where an increased particulate count is a surrogate for an increase in potential infections agents. .

In addition to health benefits to patients a lab setting with known contaminants typically requires a high ACH. Low detector readings during unoccupied hours could be used to lower the vent rate. Significant savings could be expected when a 25 to 60 ACH is allowed to drop to 2 ACH.

The costs of special sensors is high compared to the possible benefit. Saving a patients life in an operating room has much higher value than cost of energy. That economic evaluation may put the control cost in excess of the room air handling equipment. The benefit for IAQ could be realized with over-ventilation based only on occupancy and the wasted energy without accurate sensing small enough that the pay back for more sensitive control becomes longer than the cost of sensor maintenance. It may never pay back.



## ASHRAE Technical Committee 1.4

The limits to reducing OA are determined by all the requirements for outside air: **combustion, make up for exhaust, airside economizer, and to control infiltration** with a slight positive pressure building. The additional volume that can be controlled for IAQ ventilation may be a small part of the outside air that comes into the building. Even if there were sensors to confirm IAQ is acceptable with less OA the total OA flow could never go to 0 cfm. The economics of possible benefits needs to focus only on the portion that can be controlled only for IAQ. In a lab setting it is more important to focus on the exhaust flow from hoods.

### **Preemptive control triggers**

Simple sensing for actual occupancy can initiate a preemptive increase in airflow to a space in anticipation of an increased load instead of waiting for a measured increase in CO<sub>2</sub>. This puts the ventilation when it is useful instead of a delay until it is unable to be avoid over shooting a target concentration or space temperature.

Event initiated reset of software to add more airflow would start a rapid reaction to provide more air, but would restore normal control based on ongoing sensed values. The initial increase in airflow would be held back to meet the actual load. Instead of the traditional lag to respond to a load change this strategy would lead the load but not overshoot. Traditional control is reactive to loads and occupancy the intent of this event initiated strategy is to react n advance of a load.

One method to anticipate load change would be at the enterprise level. With the addition of an schedule object the individuals who have responded to a meeting invitation would be the source for occupancy load calculation. The company meeting scheduler would be an input to the BAS San Jose, SERPA “Thermavote” is a possible example that allows individuals to use their computer to provide input to BAS with a real vote for comfort, (instead of a predicted mean vote).

### **Dissemination of hot topics**

In addition to the presentation held at the beginning of a TC meeting of the whole, our committee could distribute issue-based white papers on hot topics in the control industry. There seem to be several forums for these issues already, and an effort to get a Web discussion started died for lack of participation. Perhaps reporting on the warm mini presentations would be a useful compromise.



## **ASHRAE Technical Committee 1.4**

### **Attachment 8 – TC 1.4 Research Subcommittee Minutes**



## TC 1.4 Control Theory and Applications Research Subcommittee (RSC) Activities

Chicago – January 26m 2015

### RSC Meeting Minutes:

#### 1. Announcements

- a) Stats
  - 59 active RPs totaling \$11 million.
  - Funding and WSs in balance at the moment.
  - RTARs: 4 submitted, 3 conditionally accepted
  - WSs: 8 submitted, 5 conditionally accepted
  - 1 URPs received and under review
- b) Research Plan extended to 2018. New RAP starting to develop 2018-2026 Research Plan.
- c) Reminder: An RTAR is not required – may go direct to Work Statements. If we want to do that, first review with RAC liaison to verify that subject will be approved.
- d) Reminder: New RTARs must use new pdf form. It includes wording limits to keep the RTAR short. Also, prior knowledge of subject (background) must include references not just author opinions.
- e) Reminder:
  - RTARs and WSs should be reviewed by liaison prior to submission to RAC. TC 1.4 Research Liaison is Art Giesler [RL1@ashrae.net](mailto:RL1@ashrae.net).
  - Proposal Evaluation Criteria & Weighting Factors must be thoroughly edited specific for the project. The example in the template is just that. Note that “student involvement” in the template is not a stipulated priority, just an example.
- f) Kim Barker will take over as TC 1.4 RSC chair at next meeting

#### 2. Active Project Status:

Name	Project	PMS	Status
<b>RP 1455</b>	Advanced Control Sequences for HVAC Systems – Phase I Air Dist and Terminal Systems	Pouchak-chair, Underwood, Bridges, Ljungquist	PMS and TC 1.4 approved final report. Project is complete.
<b>RP 1587</b>	Closed Loop Control – Performance Measurement and Evaluation	Steve Taylor-chair Bill Pienta David Shipley Phil Haves David Underwood	Project awarded to University of Alabama, Zheng O'Neill. PMS met via conference call in January. Task 2 largely complete.
<b>URP 1633</b>	Data and Interfaces for Advanced Building Maintenance and Operation	Reinhard Seidl-chair Jim Kelsey, Kristin Heinemeier, Chariti Young	Final report conditionally approved at PMS meeting Monday. Will request another extension thru June 30 2015. Project is complete.
<b>RP 1746</b>	Field Validation of RP1455 Sequences	Chad Moore (chair) Barry Bridges Mike Pouchak	Field testing to show that RP1455 sequences “work”. WS developed by Taylor. Bid in fall 2014 but staff errors required rebid set for spring 2015.
<b>RP-1747 TC 4.3 w/1.4 Co-Sponsor</b>	Implementation of RP-1547 CO2-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems	Steve Taylor (chair) Dennis Stanke Len Damiano	WS approved by RAC but missed fall bid period. Scheduled to bid spring 2015.



## ASHRAE Technical Committee 1.4

### 3. Pending Research Project Status:

Status	Project	Champion	Remarks
<b>WS-1661</b> TC 4.7 w/1.4 Co-Sponsor	Development of Modelica Models for Evaluation of Supervisory Control Strategies in ASHRAE Handbook	Michael Wetter Wangda Zuo	WS sent to TC 1.4 for co-sponsorship in Sept. Negative comments from Stein and Taylor. WS to be delayed.
<b>WS 1711</b>	Optimized Sequences for Chilled and Hot Water Plants	Steve Taylor Marcelo Acosta Heejin Cho	WS developed by Taylor was conditionally approved by RAC. Taylor to update. Due no later than March 15, 2015 for spring meeting.

### 4. Possible Research Project Status:

Status	Project	Champion	Remarks
<b>Possible</b>	Optimized Supply Air Temperature Reset Strategies	Steve Taylor Joe Zhou Jim Coogan	Taylor developed RTAR for RSC review. On hold until California CIEE project with Taylor Engineering scope is developed and completed.
<b>Possible</b>	Effectiveness of Night Setback and Optimum Start	Barry Bridges Li Song Heejin Cho Peter Armstrong	Analyze energy impact of different levels of setback vs. shut-off. RTAR needed. Barry and Heejin to lead.
<b>Possible</b> cosponsor with TC1.5	HVAC System Thermal Control and Energy Performance using Work & Data Exchange Processes	Michael Pouchak	Pouchak says WS on hold for further development. Pouchak to be TC 1.4 rep on PMS.
<b>Possible</b> <del>Delete</del>	Open Generic Language for Control Systems — Phase I Proof of Concept	Michael Wetter Phil Haves Joe Zhou	<del>Open language that can be used not only for DDC applications but also for modeling</del>
<b>Possible</b>	Selecting Control Valves	Steve Taylor	On hold. RP must wait until 1587 is done – need loop “goodness” factor first. TC 6.1 would have to be cosponsor.
<b>Possible</b>	Reset of space setpoints seasonally or using online daily forecast	Kim Barker Gwelen Paliaga	Determine if comfort and efficiency are improved by using seasonal space temperature setpoint reset or using next-day forecast obtained via internet. Also using forecast for pre-cooling strategies. Could start with simulation followed by real-building studies. Wait for CIEE research.
<b>Possible</b>	Object Oriented HVAC Control	Brent Eubanks Kim Barker	Rules connecting system components to use for hierarchal alarms and more.
<b>Possible</b>	Waterside economizer control optimization	Jeff Stein Steve Taylor Mark Hydeman	Issues like when it is not worth keeping CT fans at full power, when to re-enable economizer based on estimates of approach temperatures. Stein to do WS or RTAR by June meeting.
<b>Possible</b>	Controlling HVAC using effective temperature (ET)	Joe Zhou	Does using ET instead of drybulb temperature reduce energy efficiency? Simulation followed by field test. Joe looking for grad student to develop this.
<b>Possible</b> <del>Delete</del>	<del>Coordinating control of hybrid radiant and air systems for maximum efficiency</del>	Jin Wen	<del>Applies primarily to hybrid systems but also could apply to DOAS with respect to supply air temperature control.</del>
<b>Possible</b>	Optimizing TES control with weather forecasts or model predictive control	Marcelo Acosta Heejin Cho	Focus will be on ice storage since it is more susceptible to energy impact if storage is depleted.
<b>Possible</b>	Advanced alarm strategies	Brent Eubanks	Extend what RP-1455 did with hierarchal alarms to reduce nuisance alarms, ensure critical alarms are not ignored.
<b>Possible</b>	Develop conventional sequences from MPC optimized sequences	Phil Haves	Near-optimum sequences developed from model predictive controls that are too cumbersome to work in realtime control systems.
<b>Possible</b>	Chilled water setpoint reset vs. pump differential setpoint reset for CHW plants	Steve Taylor	Chilled water setpoint reset increases pump energy but decreases chiller energy, especially for VFD chillers. DP reset saves pump energy but with standard control valves, the two setpoints cannot be reset independently. Which to reset first?



## ASHRAE Technical Committee 1.4

Status	Project	Champion	Remarks
Possible	DOAS supply air temperature reset for VRF and WSHP systems	Steve Taylor Joe Zhou Jim Coogan	Reset logic is not straight forward due to heat recovery that occurs between interior and exterior zones.
Possible	%kW vs, %CFM and %GPM curves for real systems	Steve Taylor Joe Zhou Jim Coogan	Real variable flow systems do not have ideal parabolic system curves because of closing dampers/valves. DP setpoint reset helps but

5. Research RTARs and WS Deadlines:

- March 1 for spring meeting
- May 15 for June meeting
- August 15 for fall meeting
- December 15 for January meeting

6. Adjourn 4:05 pm

7. In Attendance: See main TC attendance table.



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 9 – TC 1.4 EDUCATION SUBCOMMITTEE MINUTES**





## ASHRAE Technical Committee 1.4

Jan 25 2015 - TC 1.4 Education Subcommittee meeting minutes

A quick recap of the events starting 2009 that led to the creation of the subcommittee and to the current state of affairs. In summary, complains about building controls not working properly in a big percentage of buildings due to poor system of controls design and/or poor job execution and/or poor operation, put in evidence the need for bringing the qualifications of all the professionals affecting building controls performance up to a standard level of required competencies. This includes those who design, build or operate the systems controlled.

The initial proposal was identifying those competencies and create a testing program that would allow ASHRAE to certify Building Automation professionals. This proposal was turned down by ASHRAE after conducting a survey which indicated it would not be financially sound. The idea then shifted to creating the syllabus for full programs for building automation technicians and engineers, as well as the building automation components in HVAC design engineering and architecture programs. A generic draft syllabus was put together for the Annual 2014 conference.

In order to support the eventual future creation of a testing program, it was proposed to flesh out the program by building a Wiki site with the help of external volunteers. It would point to educational material (books, courses, videos, projects, etc.) which would provide the material to generate certification questions, and also be a go-to place for professionals who wanted to improve their competencies. This initiative was presented to the ASHRAE Publications staff at the Annual 2014 conference. They declined to support it. With no official support from ASHRAE, the project can't be officially undertaken by the TC.

Marcelo Acosta stated he will start the wiki site without any references to ASHRAE and invite anyone interested to contribute.

It was proposed to complete the work on the syllabuses and publish them as a Special Publication.

**Motion:** Request the full TC1.4 committee ask ASHRAE for authorization to write a Special Publication which will list the minimum Building Automation competencies required by different types of Building Automation professionals (field technicians, programmers, designers, system integrators, etc.) and related professionals (HVAC and plumbing engineers, architects, security consultants, etc.)

Motion passed 10-0-0

Regards,  
Marcelo Acosta



## **ASHRAE Technical Committee 1.4**

### **ATTACHMENT 10 – TC 1.4 PROGRAM SUBCOMMITTEE MINUTES**



## ASHRAE Technical Committee 1.4

### TC 1.4 – PROGRAM SUBCOMMITTEE ASHRAE WINTER MEETING, CHICAGO JANUARY, 2015

The subject meeting was held on Sunday, January 25, 2015 starting at 5:30 PM following the Components and Control Applications Subcommittee meeting. The attendees remained. The sign-in sheet is attached.

#### Programs Presented in Chicago:

Jan 24-Jan 28, 2015

1. *Seminar 7: Chaired by Joseph Kilcoyne*  
*Controlling a Minimum Impact Data Center*  
**Sunday**, January 25, 9:45 AM-10:45 AM, Room: State Ballroom
2. *Seminar 43: Chaired by Reinhard Radermacher*  
*Ventilation Research*  
**Tuesday**, January 27, 9:45 AM-10:45 AM, Honore Ballroom (Lobby)
3. Special Seminar: TC 1.4 Advanced Topics:
  - a. Wireless Technology by: Dave Kahn
  - b. Topics: Dashboards by: Ron Bernstein
  - c. Ongoing Commissioning by: Joseph Kilcoyne**Tuesday**, January 27, 1:00 PM-1:30 PM, Room: Empire (Lobby)
4. *Seminar 57: Chaired by Chariti Young*  
*Energy and Water Efficient Systems? Impossible without Controls*  
**Wednesday**, January 28, 9:45 AM-10:45 AM Room: Monroe Room

#### Anticipated Programs for Chicago That Did Not Take Place:

1. *Seminar: Chaired by Ron Bernstein*  
What's new with guideline 13? Specifying integration for a building automation system.
2. *Conference Paper: Chaired by Jim Coogen*  
*Representing Building System Hierarchies with Corresponding BAS Data Structures*
3. *Seminar: Chaired by Frank Shadpour*  
Hospitals and Control Systems
4. *Seminar: Chaired by Marcelo Acosta*  
Processing Large Data in Campus Environments



## ASHRAE Technical Committee 1.4

### Programs Proposed for Atlanta Summer Meeting 2015

Jun 27-Jul 1,

1. *Seminar: Chaired by Barry Bridges*  
*ASHRAE's RP 1455: Best of Class Control Sequences for Air Systems*  
*Cosponsored by GPC 36*  
*Track 5*
2. *Seminar: Chaired by Chariti Young*  
What's new with guideline 13? Specifying integration for a building automation system.
3. *Conference Paper: Chaired by Jim Coogan*  
*VAV Dampers*
4. *Seminar: Chaired by Frank Shadpour*  
Hospitals and Control Systems
5. *Seminar: Chaired by Marcelo Acosta*  
Big Data Analysis in Campus Environments
6. *Seminar: Chaired by Jeff Stein*  
Control Redundancy for Mission Critical Facilities
7. *Special Seminar: by TC 1.4 - Control Application and Theory*  
Advanced Topics

### Programs Proposed for Orlando Winter Meeting

Jan 23-27, 2016

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

### Program "Pipeline" for Future Meetings:

1. "Be Alarmed at what your BAS is not Telling You: Is no news really good news?"
2. Web-Services. XML, SOAP: How Do I Get Non-Traditional BAS Information and Use It for My Building Automation.
3. Controls, Fuel cells, Cogeneration and Micro-cogeneration



## ASHRAE Technical Committee 1.4

4. Data Analytics... What interesting information can be derived from BAS data?
5. Special Sensors: Contaminants and Microbial Sensors

### 2015 Atlanta Summer Meeting

Jun 27-Jul 1, 2015

- Track 1 HVAC&R Systems and Equipment
- Track 2 HVAC&R Fundamentals and Applications
- Track 3 Research Summit
- Track 4 Refrigeration
- Track 5 Building Operation, Maintenance, and Optimization/ Commissioning
- Track 6 Indoor Air Quality
- Track 7 Modeling throughout the Building Life Cycle
- Track 8 High Performance Buildings
- Track 9 Moving Advanced Energy Design Guidance to the Mainstream

#### Deadlines:

- 1/5/15: Website opens for seminar, forum, and workshop proposals.
- 1/5/15: Final Conference Papers are due.
- 2/9/15: Seminar, Forum, and Workshop proposals due.
- 2/13/15: Revised Conference Papers/ Final Technical

#### Presentations and Guidelines:

1. *Conference Paper vs. Technical Paper:* Conference paper is limited to eight (8) pages, the timeline is shorter and the review process less rigorous than the technical papers currently presented in the Technical Paper Sessions.
2. *Seminar and Forum Submissions:* For Seminar submissions, they should include six (6) Learning Objectives and ten (10) Questions and Answers for the session.
3. *Seminar Program Submission:* 60 minutes (1-2 speakers) or 90 minutes (3-4 speakers).

#### Upcoming Meetings:

Atlanta	Summer:	Jun 27-Jul 1, 2015
Orlando	Winter:	Jan 23-27, 2016
St. Louis	Summer:	Jun 25-Jun 29, 2016
Las Vegas	Winter:	Jan 25- Feb 1, 2017



## ASHRAE Technical Committee 1.4

*Note:*

- *Conference Paper vs. Technical Paper:* Conference paper is limited to eight (8) pages, the timeline is shorter and the review process less rigorous than the technical papers currently presented in the Technical Paper Sessions.
- *Seminar and Forum Submissions:* For Seminar submissions, they should include six (6) Learning Objectives and ten (10) Questions and Answers for the session.
- *Seminar Program Submission:* 60 minutes (1-2 speakers) or 90 minutes (3-4 speakers).
  
- *ASHRAE Announcement:* Starting at the 2016 Winter Orlando Conference, presentations will be REQUIRED to be uploaded before the conference opening onsite. If a presentation is not uploaded, the presenter will be assessed a strike, within our 3 strike program. If a presenter collects three strikes, he/she will not be selected to present at another ASHRAE conference until the issue is resolved.

These minutes stated herein were approved by TC1.4 program subcommittee on Sunday, January 25, 2015.

*Submitted by:* Frank Shadpour, PE  
TC1.4 Program Subcommittee Chair  
[frank@scengineers.net](mailto:frank@scengineers.net)



## **ASHRAE Technical Committee 1.4**

### **Attachment 11- TC 1.4 YEA Subcommittee Minutes**



## ASHRAE Technical Committee 1.4

### **TC 1.4 Control Theory and Applications YEA Subcommittee Meeting Summary**

**Chicago – January 25, 2015**

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- 2) Young Engineers in ASHRAE (YEA) attendance included YEA Regional Coordinators (YRC's) from Regions X and IV.
- 3) Discussion Topics
  - a) Challenges of recruiting YEA members and young engineers to the TC 1.4 activities:
    - i) Not many YEA members are able to travel to the Society members.
    - ii) YEA awareness of technical committee activities is poor and is an ongoing topic at YEA meetings as well.
  - b) To address these challenges, Joe Kilcoyne volunteered to modify an ASHRAE prepared PowerPoint slide deck template to provide an overview of TC 1.4 interests and activities. This will be available as a resource for TC1.4 members willing to present it to YEA groups at their local chapters. Coordination will be through the YEA Regional Coordinators (YRC's).