

AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS, INC.
1791 Tullie Circle, NE / Atlanta, GA 30329
404-636-8400

TC/TG/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/TRG No. TC 4.7 DATE: January 30, 2007

TC/TG/TRG TITLE: Energy Calculations

DATE OF MEETING: January 30, 2007 LOCATION: Dallas

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS & ADDIT'L ATTENDANCE
Dan Fisher (CHM)	2006			Suzanne LeViseur Hugh Henderson (see below for additional attendees)
Ian Beausoleil-Morrison (VC)	2006			
Joe Huang (RES)	2004			
Chip Barnaby (APP)	2005			
Richard Liesen (WEB)	2005			
Simon Rees (INTL)	2005			
Jonathan Wright (INTL)	2003			
Bass Abushakra	2005			
Michael Brandemuehl	2003	Bill Bahnfleth	2003	
Patrick Carpenter	2003			
Larry Degelman	2006			
Peter Ellis	2006			
Jan Kosny	2006			
Agami Reddy	2006	Mingsheng Liu	2004	
		George Walton	2003	

DISTRIBUTION

ALL MEMBERS OF THE TC/TG/TRG

TAC CHAIR

TAC SECTION HEAD

SPECIAL PUBLICATIONS LIAISON

STANDARDS LIAISON

HANDBOOK LIAISON

PROGRAM LIAISON

RAC RESEARCH LIAISON

PROF DEV COMM LIAISON

TECH TRANSFER LIAISON

STAFF LIAISON (RESEARCH)

STAFF LIAISON (TECH SERVICES)

STAFF LIAISON (STANDARDS)

Patricia Thomas Graef

Suzanne LeViseur

Kimball E. Ferguson

George Reeves

Douglas C Hittle

Joseph S Ferdelman

Hugh Henderson

Julian R. De Bullet

Stephen V Abernathy

Michael R. Vaughn

Michael R. Vaughn

Claire Ramspeck

ASHRAE TC 4.7 Energy Calculations

DALLAS MEETING

ACTION ITEMS

1. **MOTION:** That the TC 4.7 Chair write a letter recommending that the previous registration policy be reinstated. (Barnaby/?) **Motion carried 10-0-0 CNV.**
2. **MOTION:** That TC4.7 recommend to ASHRAE that the short course on Simplified Energy Calculations be retired (Liesen/Brandemuehl). **Motion carried 12-0-0 CN**
3. **MOTION:** That TC4.7 accept Work Statement 1416 as presented (Huang/Barnaby) **Motion carried 12-0-0 CNV.**
4. **MOTION:** That TC4.7 permit fast tracking of Work Statement 1456, with revisions as discussed and a letter ballot (Huang/Brandemuehl) **Motion carried 12-0-0 CNV.**
5. **MOTION:** That TC 4.7 accept the program plan for Long Beach proposed by Jeff Haberl (Degelman/Rees):
 - o 1st priority: Seminar: Solar Decathlon
 - o 2nd priority: Seminar: Active/Phase Change
 - o 3rd priority: Seminar: what happened to AI?**Motion carried 12-0-0 CNV**
6. **MOTION:** TC4.7 recommends that ASHRAE discontinues the publication of bin data for simplified energy calculations (Degelman/Branaby) **Motion carried 12-0-0 CNV**

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DATE OF MEETING: January 30, 2007 LOCATION: Dallas

TC/TG/TRG MEETING SCHEDULE				
LOCATION – past 12 months		DATE	LOCATION - planned next 12 months	
Québec City		June 27, 2006	Long Beach	
Dallas		January 30, 2007	June New York City	
			June 26, 2007	
			January 22, 2008	
TC/TG/TRG SUBCOMMITTEES				
Function			Chair	
Simulation and Component Models			Tim McDowell	
Applications			Chip Barnaby	
Data-Driven Modeling			Kris Subbarao	
RESEARCH PROJECTS – Current			Monitoring	Report Mode
Project Title	Contractor		Comm.Chm.	At Meeting
Appendix 1				
LONG RANGE RESEARCH PLAN				
Rank	Title	W/S Written	Approved	To R & T
	Appendix 2			
HANDBOOK RESPONSIBILITIES				
Year & Volume	Chapter Title	No.	Deadline	Handbook Subcom. Chair/Liaison
2005 Fundamentals	Energy Estimating Methods	31	June 2008	Crawley/Hittle
STANDARDS ACTIVITIES - List and Describe Subjects				
SPC 140 Standard Method of Test for Building Energy Software – Joel Neymark				
TECHNICAL PAPERS from Sponsored Research - Title, when presented (past 3 yrs. present & planned)				

Appendix 3
TC/TC/TRG Sponsored Symposia - Title, when presented (past 3 yrs. present & planned)
Appendix 4
TC/TG/TRG Sponsored Seminars - Title, when presented (past 3 yrs. present & planned)
Appendix 5
TC/TG/TRG Sponsored Forums - Title, when presented (past 3 yrs. present & planned)
Appendix 6
JOURNAL PUBLICATIONS - Title, when published (past 3 yrs. present & planned)
None

Attendance

This is a complete listing of attendees at this and the prior three meetings. It includes the voting members of the committee listed on the first page. Email addresses are listed for those who have explicitly authorized their inclusion in the minutes, which are posted on the TC's web site.

Present at TC 4.7 meeting?					Last name	First name
Add to email list	Dallas Jan 2007	Québec City June 2006	Chicago Jan 2006	Denver June 2005		
	X	X	X	X	Abushakra	Bass
	X		X	X	Anderson	J.R.
					Ahmad	Mushtaq
			X		Armstrong	Peter
				X	Bahnfleth	Bill
		X	X		Balaras	Costas
	X	X	X	X	Barnaby	Chip
	X	X	X	X	Beausoleil-Morrison	Ian
	X		X	X	Bernier	Michel
			X	X	Black	Al
					Bojic	Milorad
				X	Bourassa	Norman
	X	X	X	X	Brandemuehl	Mike
			X		Brown	Rob
	X	X	X	X	Carpenter	J Patrick
				X	Chantrasrisalai	Chanvit
		X	X	X	Claridge	David
	X	X			Cornick	Steve
	X	X	X	X	Crawley	Dru
			X		Culp	Charles
	X	X	X	X	Degelman	Larry
	X		X	X	Ellis	Peter
				X	Filler	Mike
	X		X	X	Fisher	Dan
				X	Firrantello	Joseph
				X	Goldman	Milton
			X		Gowri	Krishnan
				X	Gueymard	Chris
	X	X	X	X	Haberl	Jeff
			X	X	Haddad	Kamel
	X		X	X	Haves	Philip
			X		Hensen	Jan
	X	X	X	X	Huang	Joe
	X	X	X		Judkoff	Ron
				X	Kootin-Sanwu	Victor
	X	X	X	X	Kosny	Jan

Present at TC 4.7 meeting?					Last name	First name
Add to email list	Dallas Jan 2007	Québec City June 2006	Chicago Jan 2006	Denver June 2005		
	X		X	X	Krarti	Moncef
		X			Kummert	Michaël
		X			Laouadi	Aziz
		X		X	Lemort	Vincent
					Levermore	Geoff
		X			Leviseur	Suzanne
	X	X		X	Liesen	Richard
	X		X	X	Lisenbee	Larry
		X			Ljungquist	Damian
				X	malone	brian
	X	X	X	X	McDowell	Tim
	X	X	X	X	Neymark	Joel
			X		Nigusse	Bereket
	X	X	X	X	Norford	Les
					Pinel	Patrice
	X	X	X	X	Pedersen	Curt
					Radosevic	Marija
	X	X	X	X	Reddy	T. Agami
	X	X			Rees	Simon
		X			Roth	Stephen
					Shirey	Don
					Smith	Vernon
			X	X	Sonderegger	Robert
	X	X	X		Spitler	Jeffrey
		X			Strachan	Paul
			X		Strand	Rick
	X	X	X	X	Subbarao	Kris
				X	Theios	Jason
				X	Thomaston	Bill
			X	X	Walton	George
					Weaver	Kevin
	X	X	X		Wetter	Michael
	X	X	X	X	Wray	Craig
	X		X		Wright	Jonathan
	X	X			Xiaobing	Liu
	X				Lebrun	Jean
	X				Bou-Saada	Tarek.
	X				Henderson	Hugh
	X				MacDonald	Ian
	X		X		Gardner	Carol
	X				O'NEILL	Zheng
	X				XIAO	Dongyi

Appendix 1**RESEARCH PROJECTS****TC 4.7 RESEARCH PROJECTS STATUS****Active projects**

#	Title	Joint TC	Cog SC/ Contractor	PMSC	Dates / status
1311-TRP	Improving Load Calculations for Fenestration with Shading Devices	4.1 (cognizant TC), 4.5	Sim/Comp, University of Waterloo	Robert Hopper (chair/4.1); Ross McCluney (4.1); Chris Wilkins (4.1); Dru Crawley (4.7)	Contractor selected 6-2004 Start: 02-2005

Appendix 2**RESEARCH PLAN**

January 29, 2007

Title	TC Priority 2005-2006	Prior TC priority	Society status	TC Status	Authors or Prime Contact	Sub com.
Prioritized						
1416-RTAR Developing internal surface convection correlations for energy and load calculations	1	1 (2005-2006)	RTAR accepted 05, WS due before Aug 07	WS draft being revised	DFisher, IBeausoleil-Morrison	SCM
1404-RTAR Development of protocol for accurate prediction of building annual energy use based on minimum short-term monitoring	2	2 (2005-2006)	RTAR accepted 05, WS due before Aug 07	WS draft being revised	AReddy	DDM
1456-RTAR Models for Natural and Hybrid Ventilation	3	0 (2005-2006)	RTAR accepted Jun 06, WS due before Jun 08	WS under development	YJHuang, PHaves, GWalton, SRees	SCM
Unprioritized						
Assessment of the potential for application of moisture absorption/desorption models in whole building energy simulations to evaluate possible energy savings caused by moisture buffering effects in building enclosure and furnishings				RTAR draft under revision, no progress since Quebec City, awaiting completion of related IEA work	JKosny	SCM
Development of reference Building Information Model (BIM) for thermal model compliance testing				Expression of interest to work with TC 1.5	LNorford	A

SCM = Simulations and Component Models

DDM = Data Driven Modeling (formerly Inverse Methods)

A = Applications

Appendix 3
TECHNICAL PAPERS FROM SPONSORED RESEARCH

RP	Title	Contractor	Approved	Paper
1051	Procedures for Reconciling Computer-calculated Results with Measured Energy Data	Drexel	Chicago January 2006	<i>Reddy, T.A., 2006. "Literature Review on Calibration of Building Energy Simulation Programs: Uses, Problems, Procedures, Uncertainty and Tools", ASHRAE Transactions, vol 112(1).</i>
1051	Procedures for Reconciling Computer-calculated Results with Measured Energy Data	Drexel	Chicago January 2006	<i>Sun J. and Reddy T.A., 2006, "Calibration of Building Energy Simulation Programs Using the Analytic Optimization Approach (RP-1051)", Int. J HVAC&R Research 12(1) 177-196.</i>
1051	Procedures for Reconciling Computer-calculated Results with Measured Energy Data	Drexel	Chicago January 2006	<i>Reddy, T.A., I. Maor and C. Ponjapornpon, 2006, "Calibrating Detailed Building Energy Simulation Programs with Measured Data- Part I: General Methodology", accepted for publication in Int. J HVAC&R Research.</i>
1051	Procedures for Reconciling Computer-calculated Results with Measured Energy Data	Drexel	Chicago January 2006	<i>Reddy, T.A., I. Maor and C. Ponjapornpon, 2006, "Calibrating Detailed Building Energy Simulation Programs with Measured Data- Part II: Application to Three Case Study Office Buildings", accepted for publication in Int. J HVAC&R Research.</i>

Appendix 4
TC/TG/TRG SPONSORED SYMPOSIA

Current as of January 2007

PRESENT:

Dallas/January 2007

How Low Can You Go? Low-Energy Buildings Through Integrated Design (Co-sponsored by TC 4.7)
(Chair: Dru Crawley)

PLANNED:

Long Beach/June 2007

How Low Can You Go? Low-Energy Buildings Through Integrated Design (Co-sponsored by TC 4.7)
(Chair: Dru Crawley)

PAST:

Québec City/June 2006

Validation of Building Simulation Programs Through ASHRAE Standard 140 (Chair: Chip Barnaby)

How Low Can You Go? Low-Energy Buildings Through Integrated Design (Co-sponsored by TC 4.7)
(Chair: Dru Crawley)

Chicago/January 2006

Thermal Modeling of Phase Change Materials in Building Envelopes: Old Problem, New Developments
(Chair: Jan Kosny)

Recent Advances in Energy Simulation (Chair: Dan Fisher)

How Low Can You Go? Low-Energy Buildings Through Integrated Design (Chair: Dru Crawley)

Application of Inverse Models (Chair: Jeff Haberl)

Denver/June 2005

None.

Orlando/February 2005

None.

Nashville/June 2004

Modeling Moisture Sorption/Desorption by Building Materials (Chair Jan Kosny)

Anaheim/January 2004

Applications and Knowledge-based Tools for Enhanced Building Energy Simulation (Chair, Vern Smith)

Appendix 5
TC/TG/TRG SPONSORED SEMINARS

Current as of January 2007

PRESENT:

Dallas/January 2007

Use of 'equation solvers' for Simulation (Chairs: Jean Lebrun/Mike Wetter)

Applications of Computer Simulation in High Performance Buildings (Chair: Martha Brook)

PLANNED:

Long Beach/June 2007

Genetic Algorithms for Energy Calculations (Chair: Bass Abushakra)

Web-based Programs for Calculating Code-Compliance (Chair: Norm Bourassa)

PAST:

Québec City/June 2006

None

Chicago/January 2006

How and Why to Calibrate a Simulation to Measured Data (Chair: Robert Sonderegger)

Application and Experiences with the New Simulation Software (Chair: Dan Fisher)

Denver/June 2005

Neglected Topics in Building Simulation (Chair: Ian Beausoleil-Morrison).

Orlando/January 2005

What to do When Data Misbehave (Chair: Agami Reddy)

Nashville/June 2004

Co-sponsored with TC 7.5. Models for Automated Building/HVAC Fault Detection and Diagnostics (Chair: Michael Brandemuehl)

Anaheim / January 2004

Energy Use Calculations and Evaluations for Laboratories (co-sponsored with TC. 9.10, Chair Patrick Carpenter)

Appendix 6
TC/TG/TRG SPONSORED FORUMS

Current as of June 2006

PRESENT:

None.

PLANNED:

None.

PAST:

Chicago/January 2006

What Controls Modelling Capabilities are Needed for Energy Simulations (Chair: Phil Haves)

ASHRAE TC 4.7 Energy Calculations
Tuesday, January 30, 2007, 18h00 to 20h30
Room Houston A, Adams Mark Hotel
Dallas, Texas

1. Roll call and introductions (Haves)

- The meeting convened at 18h05.
- Fisher chair, Haves secretary.
- Quorum with 10 voting members present (8 + 2 international) out of 15 non-international.
- Introductions.

2. Accept agenda & approve minutes of Chicago meeting (Fisher) (Attachment A)

- Agenda accepted (Barnaby/Kosny). **Approved by voice vote.**
- Minutes accepted (Kosny/Reddy). **Approved by voice vote.**

3. Announcements/Liaisons (Fisher)

- New registration policy for authors – authors and session chairs will no longer get free registration for the whole of the meeting
- **MOTION:** That the TC 4.7 Chair write a letter recommending that the previous registration policy be reinstated. (Barnaby/?) **Motion carried 10-0-0 CNV**
- All presentations (Powerpoint slides) for New York City will be due one month early - a one time change to accommodate NY 'professional development hours' (pdh) requirements.
- New Section Head Suzanne LeViseur introduced herself. She announced that the criteria for the George B. Hightower Award have been modified to recognize contributions over a number of years. The award is for service to the TC in all areas except research and standards: program, handbook, officers, technical inquiries and special assignments.
- David Meredith (Professional Development Committee) reminded the committee that the short course on Simplified Energy Calculations is still 'on the books'.
- **MOTION:** That TC4.7 recommend to ASHRAE that the short course on Simplified Energy Calculations be retired (Liesen/Brandemuehl). **Motion carried 12-0-0 CNV**
- Professional Development Coordinator sought to substitute for Fisher
- Craig Wray (Vice Chair of TAC) announced that TC members, including corresponding members, will be allocated to subcommittees by the TC Chair if there are insufficient volunteers

4. Membership (Fisher)

- Bill Bahnfleth, Michael Brandemuehl, Patrick Carpenter, George Walton and Jonathon Wright will roll off after the Long Beach meeting and Moncef Krarti, Joe Neymark, Klaus Sommer and Michael Wetter will roll on.

5. Subcommittee reports

5.1 Applications: Chip Barnaby (chair) reporting: **(Attachment B)**

- Norford has discussed with SSPC 90.1 Energy Cost Budget (ECB) subcommittee chair Jason Glazer how TC4.7 might work with ECB. ECB is receptive to the possibility of joint work, the most promising area being research.
- IBPSA-USA is exploring establishing a building simulation wiki
- The subcommittee is interested in the TC 1.5 RTAR *Development of Reference Building Information Model (BIM) for Thermal Model Compliance Testing*, which has been submitted to RAC and returned with comments.
- The problem of simulation of fenestration when only ratings data is available was discussed. A short 'issue paper' will be prepared NFRC.

5.2 Data-Driven Modeling Kris Subbarao (chair) reporting: **(Attachment C)**

- RTAR's on "Use of chiller/fan data to infer building loads" and a follow-up to RP-1051: "Automated calibration of detailed building energy simulation programs" were discussed

- Discussion on other RTAR's, primarily concerned with baselining, was deferred due to lack of time (1 hr rather 1.5 hour meeting time due to miscommunication)

5.3 Simulation & Component Models Tim McDowell (chair) reporting: (Attachment D)

- Draft Work Statements on internal convection (1416) and natural ventilation (1456) were discussed and approved for submission to the full TC
- The RTAR on the assessment of moisture absorption/desorption models was put on hold pending completion of relevant IEA work.
- 10 ideas for new RTARS were generated. The topic of metrics for HVAC secondary system performance was discussed

5.4 Research, Joe Huang (chair) reporting (Attachment E)

- There is higher visibility for ASHRAE Research, due in part to interest from USGBC and co-funding from CEC
- There is a new conflict of interest policy for bidders who are also work statement authors – details on the ASHRAE web site
- 1311-RP Load calculations with shading devices (report by Barnaby):
 - TC4.1 is the lead, TC4.7 and TC4.5 are co-sponsoring.
 - work on multilayer glazings is progressing well.
 - tables on shading by blinds and drapes has been updated
 - draft report is due in 12 months.
- Research plan:
 - 3 prioritized items 1456-WS, 1416-WS, 1404-WS
 - 1 new unprioritized co-sponsored item: Development of reference Building Information Model (BIM) for thermal model compliance testing – TC1.5 is lead
- Beausoleil-Morrison described Work Statement 1416. TC4.1 will co-sponsor following clarifications of the scope.
MOTION: That TC4.7 accept Work Statement 1416 as presented (Huang/Barnaby) **Motion carried 12-0-0 CNV**
1416-PES: Kosny, Beausoleil-Morrison (chair), Bruning (TC4.1)
- Huang described Work Statement 1456. TC4.10 will co-sponsor, CEC will co-fund 50% up to \$50k, ARTI will co-fund 20% up to \$20k. Huang and Rees will revise further and submit for letter ballot. Craig Wray recommended involving TC4.3.
MOTION: That TC4.7 permit fast tracking of Work Statement 1456, with revisions as discussed and a letter ballot (Huang/Brandemuehl) **Motion carried 12-0-0 CNV**

5.5 Handbook, Dru Crawley (chair) reporting (Attachment F)

- Updating of Chapter 31 of *Fundamentals* will focus on:
 - Results from research sponsored by TC4.7
 - Ground heat transfer
 - Information on toolkits
 - Incorporation of room airflow models to energy calculations
 - Window modeling
 - Validation
 - Comparison of simulation tools
 - Simulation for code compliance
 - New areas of simulation: water, onsite power, green roofs, natural ventilation, duct modeling ...
- Volunteer writers are sought.
- Reviewers are sought
- The new chapter needs to be reviewed and voted out in 18 months

5.6 Program, Jeff Haberl reporting for Rick Strand (chair), who has resigned and will be replaced by Michael Wetter (Attachment G)

- One Symposium ("How Low Can You Go? Low-Energy Buildings Through Integrated Design, chaired by Dru Crawley) and two Seminars ("Applications of Computer Simulation in High Performance Buildings", chaired by Martha Brook, and "Use of 'Equation Solvers' for Simulation", co-chaired by Jean LeBrun and Mike Wetter) were presented at the Dallas meeting

- Proposed plan for Long Beach consists of one Symposium ("How Low Can You Go? Low-Energy Buildings Through Integrated Design, chaired by Dru Crawley) and three Seminars
 - **MOTION:** That TC 4.7 accept the program plan for Long Beach proposed by Jeff Haberl (Degelman/Rees):
 - 1st priority: Seminar: Solar Decathlon
 - 2nd priority: Seminar: Active/Phase Change
 - 3rd priority: Seminar: what happened to AI?
- Motion carried 12-0-0 CNV.**

5.7 Standards, Joel Neymark (chair) reporting (Attachment H)

- SPC 140 (Judkoff reporting).
 - Addendum "b" passed public review in September.
 - IEA Newsletter lauded S140 as a good example of research to practice
 - Data format s/com very active – put results from S140 assessments on a website.

5.8 Web Site, Liesen (chair) reporting (no attachment)

- Rules for rosters – phone numbers and emails – were clarified by Craig Wray
- Sanitized version of minutes needed – remove email addresses

6. Reports on related activities

6.1 GPC 20 XML Definitions for HVAC&R (Barnaby)

- Draft guideline in moderate shape.
- 4 use cases well developed – design, system sizing, commissioning, operations
- 1354-RP (TC1.5) 95 data groups commonly exchanged

6.2 TC 2.8 Sustainability (Crawley)

- TC2.8 is sponsoring Standard 189 (Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings) and Standard 191, which deals with water conservation

6.3 TC 4.1 Load Calculations (Spitler)

- TC 4.1 will co-sponsor 1416-WS
- More heat gain measurements work, including development of a method of measurement, is being pursued.

6.4 TC 4.2 Climatic Information (Barnaby)

- Data for 2009 printed handbook is currently being considered.
- **MOTION:** TC4.7 recommends that ASHRAE discontinues the publication of bin data for simplified energy calculations (Degelman/Barnaby) **Motion carried 12-0-0 CNV**

6.5 TC 4.5 Fenestration (no report)

- Performance path approach: interest in method of assessing windows in-situ
- Need for best simulation methods to be used in support of Standard 90.1

6.6 TC 6.5 Radiant Heating and Cooling (no report)

6.7 TC 7.4 Building Operation Dynamics (Brandemuehl)

- Current topics include utility operations, load curtailment, short term building response and the effect on the utility of CHP and building integrated PV

6.8 TC 7.5 Smart Building Systems (Reddy)

- Current topics include fault detection and diagnosis, wireless communications for monitoring and control

6.9 TC 7.6 Systems Energy Utilization (no report)

6.10 IAI International Alliance for Interoperability (no report)

6.11 Standard 90.1 (Liesen)

- Public comments have been received challenging the technical calculation methods.

6.12 IBPSA (USA, Canada, World, BS 2007)

- IBPSA-USA (Brandemuehl):
 - 50 people at meeting.
 - Interaction with US GBC on training for simulation, Wiki-like database for simulation topics.
 - Bill Sisson (UTRC/World Business Council for Sustainable Development) will be dinner speaker in Long Beach.
- IBPSA-Canada (Beausoleil-Morrison):
 - Scholarships for students.
 - eSim 2008 will be in Montreal
- IBPSA-World (Beausoleil-Morrison):
 - Excellent facilities at Tsinghua University for BS'07
 - ~600 abstracts, 300 papers expected, due March 1.

7. Old Business

- none.

8. New business

- none.
-

9. Adjourn

- Meeting adjourned at 20h15.

Attachments

- A. Agenda
- B. Applications Subcommittee Minutes
- C. Data Driven Modelling Subcommittee Minutes
- D. Simulation and Component Models Subcommittee Minutes
- E. Research Subcommittee Minutes
- F. Handbook Subcommittee Minutes
- G. Program
- H. SSPC 140 Minutes

ASHRAE TC 4.7 Energy Calculations

Tuesday, January 30, 2006, 6:00-8:30 p.m.

Houston Ballroom A

Convention Center, Third floor

Dallas, Texas

1. Roll call and introductions	Haves
2. Accept agenda & approve minutes of Chicago meeting	Fisher
3. Announcements/Liaisons	Fisher
4. Membership	Fisher
5. Subcommittee reports	
5.1 Applications	Barnaby
5.2 Data-Driven Modeling	Subbarao
5.3 Simulation & Component Models	McDowell
5.4 Research	Huang
1311-RP Improving Load Calculations for Fenestration with Shading Devices (TC 4.1/4.5/4.7; Univ. of Waterloo)	Crawley
Work stements for consideration	Huang
5.5 Handbook	Crawley
5.6 Program	Haberl
5.7 Standards	Neymark
SSPC 140 SMOT for Eval Building Energy Analysis Computer Programs	Judkoff
IEA Annex 34/43 Test and Validation of Building Energy Simulation Tools	Judkoff
5.8 Web Site	Liesen
6. Related activities reports	
GPC 20 XML Definitions for HVAC&R	Barnaby
TC 2.8 Building Environmental Impacts and Sustainability	Crawley
TC 4.1 Load Calculation Data and Procedures	Fisher
TC 4.2 Climate Information	Barnaby
TC 4.5 Fenestration	---
TC 6.5 Radiant Heating and Cooling	Strand
TC 7.4 Building Operation Dynamics	Brandemuehl
TC 7.5 Smart Building Systems	Reddy
TC 7.6 Systems Energy Utilization	Abushakra
IAI International Alliance for Interoperability	---
IBPSA: USA, SimBuild 2006; Canada, eSim 2006; IBPSA, BS 2007	Brandemuehl, Beausoleil- Morrison, Hensen
7. Old Business	
8. New business	
9. Executive Session	
10. Adjourn	

ASHRAE TC 4.7 Energy Calculations
Applications Subcommittee
Tuesday, January 30, 2007, 3:30 – 5 PM
Houston A, Adam’s Mark Convention Center, Dallas

Minutes

Attendee List

NAME	Affiliation
Kamel Haddad	NRC – Canada
Chip Barnaby	Wrightsoft
Les Norford	MIT
Jeff Haberl	TAMU
Dru Crawley	DOE
Michael Wetter	United Technologies
Tim McDowell	TESS
Joel Neymark	J.Neymark and Assc
Ian Beausoleil-Morrison	NRCan
Jan Kosny	ORNL
Larry Degelman	Texas A&M
Simon Rees	DeMonfort University
Jean Lebrun	University of Liege
Klaus Sommer	Cologne University
Jaap Hogeling	ISSO, Netherlands
Carol Gardner	GEMS
Joe Derringer	Derringer Group
Rich Liesen	Owens-Corning
Dan Fisher	Oklahoma State University
Steve Selkowitz	LBNL
Dru Crawley	DOE

Chip Barnaby started the meeting at 3:35 PM with introductions and approval of agenda.

PROGRAM

Simulation Support for the 2007 Solar Decathlon (chair: Kamel Haddad). Submitted for Dallas but was not accepted. Applications recommends that the session be resubmitted for Long Beach.

Ideas for New York or future meetings.

- *Fenestration Data Needs for Energy and Loads Calculations* (with TC 4.1). Session not submitted for Dallas as was planned.
- *Web-Based Programs for Calculating Code Compliance*.
- *Appliance Performance Compliance Tools to Mitigate Climate Change*. Carol Gardner knows of potential speakers.

STANDARD 90.1 COORDINATION

Norford reported on how TC 4.7 might work with SSPC 90.1 Energy Cost Budget (ECB) subcommittee. He reported on his meeting with the subcommittee and conversations with Jason Glazer, ECB chair. ECB is receptive to the possibility of joint work.

In the discussion that followed, the consensus was that research is the most promising area for cooperation. Norford agreed to continue discussion with Jason Glazer and the ECB subcommittee to identify research topics of mutual interest.

IBPSA-USA BUILDING SIMULATION WIKI

Barnaby reported that IBPSA-USA is exploring establishing a building simulation wiki. Michael Wetter, Vern Smith, and Chip Barnaby are looking into technical and intellectual property issues. Comments or additional participation are welcome.

RESEARCH

BIM data translation. The TC 1.5 RTAR *Development of Reference Building Information Model (BIM) for Thermal Model Compliance Testing* is under development. It has been submitted to RAC and was returned with comments. This RTAR proposes research to define procedures for automated generation of simulation thermal models from CAD applications and to develop tests to verify correctness of such generation.

The subcommittee remains interested in being involved in this project.

Ian Beausoleil-Morrison, Michael Wetter, and Joel Neymark have reviewed the RTAR. Michael Wetter will assemble their comments and transmit them to TC 1.5 chair Rob Hitchcock.

Simulation of fenestration when only ratings data is available. This problem was discussed in relation to design modeling and also generic parametric modeling for standards development. The difficulty is that a given SHGC / U-factor combination can correspond to many actual window assemblies, so those inputs are not sufficient to define detailed simulation input. Joe Huang has developed a proposed input preparation procedure for the CEC; he will circulate a description of the method.

After some discussion, Chip Barnaby and Joe Huang agreed to write a one-page issue paper that Steve Selkowitz can bring forward at the upcoming NFRC board meeting. This analysis may lead to identification of research topics as well.

Representative Data for Residential Energy and Load Calculations. The Building America residential assumptions are complete and obviate the need for this project. Drop.

OTHER RESEARCH TOPICS. *BARNABY REVIEWED THE REMAINING RESEARCH TOPICS AND URGED THEIR CHAMPIONS TO MAKE PROGRESS.*

OTHER BUSINESS. *NONE.*

Meeting adjourned 5:10 PM.

ACTION ITEMS

<i>Who</i>	<i>When</i>	<i>What</i>
Barnaby	Immediately (done at TC 4.7 meeting)	Request that TC 4.7 Chair (Fisher) transmit to RAC support for Std. 90.1 RTAR
Wetter	Early Feb.	Integrate comments on TC 1.5 BIM RTAR and transmit to Rob Hitchcock
Huang	Immediately	Distribute CEC write-up on modeling fenestration given standard ratings
Huang, Barnaby	Mid February	Write one-page briefing paper on fenestration rating issues for Steve Selkowitz to present to NFRC board.

Summary TC4.7 Data-Driven Modeling Subcommittee

Monday, January 29, 2007

6:30 to 7:30 p.m.

Dallas, TX

Chair: Kris Subbarao

Meeting started at 6:35 pm with 17 in attendance. Chair called session to order followed by introductions and approval of Quebec City meeting minutes.

Program:

Seminar for Long Beach: "Whatever happened to AI?" A. Reddy, Chair. Three speakers lined up and this session was bumped from Dallas. Information about topics and speakers uploaded to web site a few months ago. The speakers have confirmed participation for Long Beach.

Symposium for Long Beach: "Survival of the least Square Fittest: Genetic Algorithms for Buildings", possible speakers - Jonathan_Wright/Loughborough from RP-1049 - 2 papers have been submitted to HVAC&R, one accepted and one being reviewed, agreed to present them again in a symposium, but wanted a new title; new working title: "HVAC system design optimization". L. Norford to follow up.

Technical Session for New York: "Use of Equation Solver for Building Simulation" Mike Wetter, Chair. Follow up of Seminar with the same title and Chair held in Dallas

Seminar for Long Beach: R. Sonderegger chair - 2 papers by Claridge and Liu from RP-1092, 2 papers by A. Reddy from RP-1051. Sonderegger told A. Reddy that he was not coming to Long Beach. Also, A. Reddy said his 2 papers have already been presented. Dropped for now.

Work statement:

"Modeling, Analysis, and Reporting Protocols for Predicting Annual Energy Performance from Short-term Building Energy Monitoring" nearly ready, but with suggested changes will be voted on in Long Beach. Reddy with Joe Huang, Les Norford, and Vern Smith will work on this.

RTAR:

1. "Procedure for baselining energy use at large central plants". Given to A. Reddy, recommendation: drop
2. "Use of chiller/fan data to infer building loads" will be developed further for discussion in Long Beach, assigned to A. Reddy with A. Abushakara. J. LeBrun asked if much work is needed on this topic.
3. Follow-up of RP-1051: "Automated calibration of detailed building energy simulation programs" will be developed further for discussion in Long Beach, assigned to K. Subbarao

Not discussed due to lack of time (meeting allocated 1 hour instead of the usual 1.5 hours due to miscommunication):

4. Procedures for adjusting baseline models for M&V projects due to creep and other causes
5. Development of procedures for baselining electricity demand savings
6. Development of procedures for baselining water use in a facility
7. Development of in-situ procedures for baselining energy savings from renewable projects
8. Procedures to develop performance modes of HVAC&R equipment from published manufacturer data

9. Use of evolutionary computation for inverse problem

New Ideas:

1. Standardized M&V for savings from operational changes: SAT reset, static pressure reset, ..."
2. Certification of built buildings against code such as LEED"
3. Standardization (ActiveX DLL, ...) of software component of deliverables of ASHRAE projects sponsored by the subcommittee, so that users can imbed them directly in their software.

Dan Fisher will try to restore 1.5 hours for the meeting in Long Beach and beyond. (Reduced to 1 hour in Quebec City and beyond due to miscommunication; the meeting do need the full hour and a half.)

Meeting was adjourned at 7:35 pm.

Attendees:

Last Name	First Name	Affiliation
Abushakra	Bass	MSOE
Bou-Saeda	Tarek	Oklahoma State U.
Chervil	Rudy	Johnson Controls Inc
Fisher	Dan	Oklahoma State U.
Haberl	Jeff	TAMU
Huang	Joe	LBNL
Judkoff	Ron	NREL
Kamel	Haddad	Natural Resources, Canada
Kauffman	Justin	York/JCI
Krarti	Moncef	Univ. of Colorado
Norford	Les	MIT
Padmanabhan	Sankar	Oklahoma State U.
Reddy	Agami	Drexel Univ
Smith	Vern	AEC
Subbarao	Kris	TAMU
Wetter	Michael	United Technologies
Wright	Jon	Loughborough U.

TC4.7 Simulation and Component Models Subcommittee Minutes
Dallas, Monday, January 29, 2007
Chair: Tim McDowell

Called to Order 7:40 pm

Attendance

Tim McDowell	TESS
Philip Haves	LBNL
Jon Wright	Loughborough University
Ron Judkoff	NREL
Moncef Krarti	University of Colorado
Kamel Haddad	Natural Resources Canada
Jan Kosny	ORNL
Chip Barnaby	Wrightsoft
Ian Beausoleil-Morrison	Natural Resources Canada
Dan Fisher	OSU
Jeff Haberl	Texas A&M
Joel Neymark	JNeymark Associates
Diego Arias	University of Wisconsin-Madison
Jean Lebrun	University of Liege
Michael Wetter	United Technologies Research Center
Simon Rees	De Montfort University
Jeff Spitler	Oklahoma State University
Joe Huang	LBNL
Steve Cornick	NRC
Atila Novoselac	University of Texas-Austin
Kris Subbarao	Texas A&M
Vern Smith	Architectural Energy Corp
Joe Deringer	The Deringer Group Inc
Klaus Sommer	Cologne Univ of Applied Sciences
Curt Pedersen	University of Illinois
Sankar Padhmanabhan	Oklahoma State University
Don Shirey	Florida Solar Energy Center
Noel Susskind	Arora Engineers
Richard Liesen	Owens Corning

PROGRAM

Dallas (January 2007)

- **Seminar** on *Use of 'Equation Solvers' for Simulation* (Chaired by: Mike Wetter)

Long Beach (June 2007)

- **Seminar** on *Modeling and Experimental Validation of Active Building Components* (Chaired by: Jan Kosny)

New York (January 2008)

- **Symposium** on *Modeling and Experimental Validation of Active Building Components* (Chaired by: Jan Kosny)
- **Symposium** on *Use of 'Equation Solvers' for Simulation* (Chaired by: Mike Wetter)
- **Seminar** on *Performance Models of HVAC components from manufacturer's data* (Chaired by Mike Wetter)

Salt Lake City (June 2008)

- **Symposium** on *Evolution Design of HVAC Systems* for RP 1049 (Chaired by Les Norford)

WORK STATEMENTS

- *Development of Internal Surface Convection Correlations for Energy and Load Calculation Methods* WS-1416 (Dan Fisher, Ian Beausoleil-Morrison). Draft work statement was circulated for comments. The inclusion of different diffusers and what coefficients will be measured was discussed. Whether the proposed budget of \$200,000 is enough was discussed. TC 4.1's interest in co-sponsorship – Jeff Spitler will contact TC 4.1 about co-sponsorship. Subcommittee voted to bring Work statement to full TC for approval.
- *Assess and Implement Natural and Hybrid Ventilation Models in Whole-Building Energy Simulation* WS-1456 (Joe Huang, Simon Rees, George Walton). TC 4.10 expressed support of work statement. Simon Rees will approach TC 5.3. CEC will co-fund 50% up to \$50,000. ARTI will co-fund 20% or \$20,000. CIBSE would work with ASHRAE on project. The difficulty of the scope and whether more basic wind tunnel tests to provide pressure coefficients. The purpose of the project is to determine if the data available is any good. A better reference to previous IEA work is needed. Work Statement is intended to assess the current state of the models and whether they can be validated. A question of whether more detail on the different types of mixed modes is necessary. The mixed mode is more of a controls issue of the system. It might be helpful to be explicit about the type of building being considered. Joe Huang will work to finish and get approval by letter ballot.

RTARS

- *Assessment of the Potential for Application of Moisture Absorption/Desorption Models in Whole Building Energy Simulations to Evaluate Possible Energy Savings Caused by Moisture Buffering Effects in Building Enclosures and Furnishing* (Jan Kosny, Andre Desjarlais). (a HIGHEST priority item) Put on the shelf until the completion of the IEA Task on this.
- *Performance Metrics for HVAC Secondary Systems* (Jonathon Wright) A new idea for a RTAR for a metric of evaluating HVAC secondary systems. Jeff Haberl and Chip Barnaby raised concerns and will work with Jon on this RTAR.
- *Development of Integrated Models for Liquid Dessicant Dehumidification Driven by Heat Recovery or Renewable Energy* (Jeff Haberl).
- *Thermal Mass Toolkit: Optimization of the Calculation of the Thermal Mass Energy Benefits for Residential and Commercial Buildings* (Jan Kosny).
- *Development of Humidistat-Driven Air-Conditioner Model for Residential Applications* (Jeff Haberl).
- *Modeling of the ground heat exchanger in foundation systems* (Jan Kosny)
- *Combined Modeling of Daylighting and Energy Calculations* (Jeff Haberl)
- *Energy Calculations and Water Usage* (Jeff Haberl)
- *Natural Ventilation Controls* (Jeff Haberl)
- *Infiltration of Crawlspace and Attics* (Jeff Haberl)
- *Modeling of Green Roofs* (Jeff Haberl)

New Business

Adjourned 9:10

ASHRAE
Technical Committee 4.7 Energy Calculations
2006-2007 Research Plan
(January 29, 2007)

Title	TC Priority 2005- 2006	Prior TC priority	Society status	TC Status	Authors or Prime Contact	Sub com.
Prioritized						
1416-RTAR Developing internal surface convection correlations for energy and load calculations	1	1 (2005-2006)	RTAR accepted 05, WS due before Aug 07	WS approved by subcommittee, and referred to full committee	DFisher, IBeausoleil- Morrison	SCM
1404-RTAR Development of protocol for accurate prediction of building annual energy use based on minimum short-term monitoring	2	2 (2005-2006)	RTAR accepted 05, WS due before Aug 07	WS draft developed, modifications needed, will be represented at Long Beach	AReddy, YJHuang	DDM
1456-RTAR Models for Natural and Hybrid Ventilation	3	0 (2005-2006)	RTAR accepted Jun 06, WS due before Jun 08	WS draft reviewed in subcommittee, modifications needed, may be referred to full committee for letter ballot	YJHuang, SRees, GWalton	SCM
Unprioritized						
Assessment of the potential for application of moisture absorption/desorption models in whole building energy simulations to evaluate possible energy savings caused by moisture buffering effects in building enclosure and furnishings				RTAR draft under revision, no progress since Quebec City, awaiting completion of related IEA work	JKosny	SCM
Development of reference Building Information Model (BIM) for thermal model compliance testing				Expression of interest to work with TC 1.5	LNorford	A

SCM = Simulations and Component Models

DDM = Data Driven Modeling (formerly Inverse Methods)

A = Applications

Meeting Minutes

Handbook Subcommittee

ASHRAE TC 4.7 Energy Calculations
5:00-6:00 pm, Tuesday, January 30, 2007
Adam's Mark Houston Ballroom A
Dallas, Texas

Present: Dru Crawley (Subc Chair)
Dan Fisher
Jeff Haberl
Joel Neymark
Les Norford
Michael Wetter

Chair Crawley called the meeting to order at 5:15 pm. Those present introduced themselves.

Crawley indicated that electronic copies of the 2005 Fundamentals Chapter 32 were available for review. The schedule for the update of the chapter has TC 4.7 voting to approve the updated chapter by the Annual Meeting in 2008.

The group quickly reviewed the existing chapter material and suggested that work be focused on the following areas:

- Updates for recent TC 4.7 research projects including 865-RP, 1049-RP, 1050-RP, 1051-RP, 1052-RP, 1092-RP, 1093-RP, 1311-RP, etc
- Ground heat transfer needs substantial updating including Beausoleil-Morrison, Bahnfleth and Deru. Need revisions to Krarti...
- Table 1, Haberl students to update
- Need discussion of toolkits and updates—Loads, HVAC1, HVAC2.
 - Brandemuehl agreed to update information on HVAC2 toolkit.
 - LeBrun agreed to update information on HVAC1 toolkit
- Couple airflow models plus displacement, UFAD (Haves/Hensen)
- Genetic algorithms/1049-RP (Wright/Nelson)
- Window blinds/shades/screens modeling/1311-RP (Barnaby)
- Bringing the validation/testing methods discussion up to date (Neymark/Judkoff)
- Comparison of simulation tools (Crawley)
- Look at ASHRAE-HQ as possible example-- (1093 example?) (Haberl)
- Simulation for code compliance
- New areas of simulation: water, onsite power, green roofs, CFD applications linking, natural ventilation, duct model,

It was agreed to again solicit authors/reviewers at the TC 4.7 meeting.

Crawley will email those present to ask if they want a copy of the current chapter in electronic form to those present.

By March 1, Crawley will put out a call for topic areas/updates to the chapter on the TC 4.7 mail list. Also, Crawley will make a call for reviewers of the existing chapter. To provide input by

Crawley will include a strawman of a proposed outline with annotation of existing text/needing updates/new sections /text.

A review of Chapter 32 (2005 F) received from the Handbook Committee in January is attached. The review shows a number of minor typographical changes needed.

Meeting ended at 5:40 PM.

ASHRAE® HANDBOOK
CHAPTER REVIEW FORM

Handbook Volume Reviewed: Fundamentals Volume Year: 2005 Date: 12-7-2005

Chapter No. 32 Chapter Title Energy Estimating and Modeling Methods

1. Does this chapter, in your opinion, truly reflect the state of the art? Yes No Somewhat

If you answered "no" or "somewhat," please indicate typical example(s) below or provide an attachment.

2. Check the description that most nearly categorizes the relevance and balance between theory and practice in this chapter:

- a. Too much theory, not enough practical application.
- b. Just about right.
- c. Too little theory to support the recommendations.
- d. Obsolete—remove this subject from ASHRAE publication.
- e. Other: _____

3. Tables in this chapter are (check all that apply):

- a. Clear and understandable.
- b. Adequately footnoted.
- c. Properly referenced in the text.
- d. Sufficient for the average user.
- e. Too voluminous for a Handbook chapter.
- f. Inadequately documented.
- g. Not required (please list specific tables):
- h. Other: _____

1. Please identify tables prompting negative comments:

2. Please suggest tables, if any, that should be added to make the chapter more useful:

4. Equations and derivations are (check all that apply):

- a. Clear and understandable.
- b. Sufficient for the average user.
- c. Properly referenced in text.
- d. Properly footnoted to identify variables.
- e. Too voluminous for a Handbook chapter.
- f. Inadequately documented.
- g. In need of improvement.
- h. Not required (please list specific equations or passages):
- i. Other: See comments at end.

1. Please identify derivations/equations prompting negative comments:

2. Please suggest alternatives:

5. The examples given in this chapter are (check all that apply):

- a. Clear and understandable.
- b. Adequate for the average user.
- c. Appropriately interfaced with the text.
- d. Mathematically correct.
- e. Use the tables as indicated by the text.
- f. Inappropriate.
- g. Obsolete.
- h. Too complicated.
- i. Useless.
- j. Not required (please list specific examples):
- k. Other: _____

1. Please identify examples prompting negative comments:

2. Please identify sections that need more explanation or examples to clarify them:

6. The figures and graphics in this chapter are (check all that apply):

- a. Clear and understandable.
- b. Adequate for the average user.
- c. Appropriately interfaced with the text.
- d. Properly footnoted.
- e. Hard to read.
- f. Inappropriate.
- g. Obsolete.
- h. Not required (please list specific figures): _____
- i. Other: _____

1. Please identify figures or graphics prompting negative comments:

2. Please suggest additional figures, if any, that should be added to the chapter:

7. ASHRAE maintains a reputation as the “Standard of the Industry” in HVAC&R matters, with the Handbook series serving as its “bible.” In this context, and on an ascending scale from 0 to 7, please rate your overall evaluation of this chapter as a worthy representative of and contributor to this traditional role:

- 7 Couldn't be better in any way.
- 6 Well done—only nominal review required.
- 5 Okay, but needs update more often.
- 4 Technically correct, but needs editing.
- 3 Technically acceptable, but needs amplification.
- 2 Not technically up to date, but better than nothing.
- 1 Completely revise and update or drop immediately.
- 0 Drop from Handbook or any other publication.

COMMENTS:

- 1) On page 32.5 in the first full paragraph, third sentence, reference to Equation (36) of Chapter 30 should be Equation (27) of Chapter 30. Also needs to be corrected from (36) to (27) in third paragraph.
- 2) On page 32.5 in the fourth paragraph, reference to Equations (35) and (34) in Chapter 30 should be Equations (26) and (25).
- 3) On page 32.16 second column second line, reference to Equation (36) should be Equation (48).
- 4) On page 32.16 second column fourth and fifth paragraphs, references to Equation (34) should be Equation 47 in three places.
- 5) The following were noted in 'References' but not found in the body of the chapter text:
 - a) Haberl et al 1997
 - b) Reddy et al 2003
- 6) Reference for Bonne and Jansen dated 1989 in 'References' and 1985 in chapter text.
- 7) Reference for Yazdanian & Klems dated 1994 in 'References' and 1993 in chapter text and under 'Empirical Validation'.

Please check this box if you wish to receive feedback via e-mail on your comments from this chapter's TC. (Please note that any contact information you provide will be used only for this purpose, and will not be shared with any other parties.)

Name: Rennie Tisdale

E-mail:

**TC 4.7 Program Plan
Dallas ASHRAE Meeting
January 30th, 2007**

Long Beach June 23-27th, 2007 *Deadlines: Package 2/9/07**

#1 Symposium “How Low Can You Go? Low-Energy Buildings Through Integrated Design”
Organized by: TC 2.8 (Co-sponsor)
Chaired by: Dru Crawley
Status: Moved from Dallas, 4 papers in review

#1 Seminar “Simulation Support for the 2007 Solar Decathlon”
Organized by: TC 4.7 (Application)
Chaired by: Kamel Haddad
Status: Moved from Dallas (6 possible presentations)

#2 Seminar “Modeling and Experimental Validation of Active/Phase Change Building Envelope Components”
Organized by: TC 4.7 (Simulation and Component Models)
Chaired by: Jan Kosny
Status: Moved from Dallas, 4 presenters

#3 Seminar “What Ever Happened to AI for Simulation”
Organized by: TC 4.7 (Data Driven Models)
Chaired by: Agami Reddy
Status: Moved from Dallas, 3 abstracts received (Cal Poly; PNNL, ISU)

New York, January 19-23, 2008 * Deadlines: Manuscripts 4/6/07; Package 8/3/07**

Symposium “Modeling and Experimental Validation of Active/Phase Change Building Envelope Components”
Organized by: TC 4.7 (Simulation and Component Models)
Chaired by: Jan Kosny
Status: Moved from Dallas, 2 papers done.

Symposium “How and Why to Calibrate a Simulation to Measured Data”
Organized by: TC 4.7 (Data Driven Models)
Chaired by: Robert Sonderegger
Status: Moved from Dallas (Claridge and Liu from 1092-RP, Reddy from 1051-RP)

Seminar “Use of ‘equation solvers’ for Simulation”
Organized by: TC 4.7 (Data Driven Models)
Chaired by: Michael Wetter
Status: Changed from Symposium to Seminar, 4 presenters identified

Seminar “Genetic Algorithms for Energy Calculations”
Organized by: TC 4.7 (Data Driven Models)
Chaired by: Bass Abushakra
Status: Moved from Dallas

Seminar “Modeling of Double Envelope Facades and Active Windows”

Organized by: TC 4.7 (Simulation and Component Models)

Chaired by: Mike Brandemuehl

Status: Moved from Dallas

Seminar “Fenestration Data Needs for Energy and Loads Calculations”

Organized by: TC 4.1 Loads

Co-Sponsored by TC 4.7 (Application)

Chaired by Glen Friedman

Status: Moved from Dallas

Seminar “Web-based Programs for Calculating Code-Compliance”

Organized by: TC 4.7 (Applications)

Chaired by: Norm Bourassa, CEC

Status: Moved from Dallas, would focus on web-based, XML or IFC applications

Seminar “Applying Performance Assessment Tools to mitigate Climate Change”

Organized by TC 4.7 (Applications)

Chaired by: Carol Gardiner

Status: New

Seminar “Simulation of HVAC/R Components based on published Manufacturer Data”

Organized by: TC 4.7 (Simulation and Component Models)

Chaired by: Michael Wetter

Status: New

Salt Lake City June 12-25, 2008

***** Deadlines: Manuscripts 9/28/07; Package**

2/8/07

Symposium “Use of ‘equation solvers’ for Simulation”

Organized by: TC 4.7 (Data Driven Models)

Co-chaired by: Jean LeBrun/Mike Wetter

Status: New, would be based on 4 abstracts from Dallas

Seminar “Experience with Simulation of Standard 90.1 Code-compliant Buildings”

Organized by TC 4.7 (Applications)

Chaired by: Carol Gardiner

Status: Moved from Dallas

**SSPC 140 Dallas Meeting Summary
January 29, 2007**

**Standard Method of Test for the Evaluation of Building
Energy Analysis Computer Programs.**

MEETING SUMMARY

The primary purposes of the meeting were to:

- Report on pending publication of Addendum *a* (Furnace BESTEST cases) prior to public review
- Report on public review outcome of Addendum *b* (adapting HVAC BESTEST Volume 2 cases to Standard 140-2004)
- Data Format Subcommittee progress report (regarding posting Standard 140-results data on the DOE Tools web site).

Chair Announcements

Chair Announcements/Communications since last meeting [*Judkoff*]

- Per ASHRAE Staff, publication of Addendum *a* (furnace test cases) by ASHRAE is expected after January 2007 (Dallas meeting), with the next supplement/reprints of code intended standards. NREL completed a (probably final) galley review in January and submitted editorial comments to ASHRAE Staff.
- Addendum *b* (HVAC BESTEST Volume 2, unitary cooling equipment dynamic comparative test cases) passed through public review (Sep 22 – Nov 6, 2006) with no comments. Per ASHRAE Staff, publication of the addendum by ASHRAE is expected after January 2007 (Dallas meeting), with the next supplement/reprints of code intended standards. NREL completed an initial galley review in December and submitted a number of editorial comments to ASHRAE Staff. ASHRAE distributed a revised galley, and NREL completed a second (probably final) galley review in January, and submitted further editorial comments to ASHRAE Staff.
- In July, the Chair distributed FSEC's electronic version of NREL's HERS BESTEST to the full PC for comments. Neymark was the only commenter, and during Aug 30 – Sep 1 provided a number of comments to Fairey regarding how to proceed with adaptation for Standard 140.
- IEA has published a newsletter article which describes Standard 140 as a project that exemplifies transfer of IEA research to industry. IEA BESTEST and HVAC BESTEST Vol. 1 (basis of Standard 140-2004) have been translated into Japanese. HVAC BESTEST Vol.2 (basis of 140-2004 Addendum B) translation into Japanese is in progress

Proposed Addendum b to 140-2004 (HVAC BESTEST Volume 2 cases)

See Chair announcements, publication of the addendum by ASHRAE is expected in February or March, with the next supplement/reprints of code intended standards.

Simulation Requirements, Federal Tax Deductions in Energy-Efficient Commercial Buildings

In Quebec, Judkoff reported Current Federal Tax Deduction for Energy Efficient Commercial buildings, released Jun 2, 2006, cites ANSI/ASHRAE Standard 140-2004 for qualifying software used for certifying deductions. DOE is only required to post a list of approved software. DOE is

allowed (optional) to post Standard-140 results, and DOE would like to work toward that in the next couple of months.

Fairey updated in Dallas. Preliminary legislation is in the U.S. Senate (sponsored by Snowe and Feinstein) to extend commercial buildings energy-efficiency tax deductions to 2011, with some modifications. Revisions to existing residential deductions will be performance based; cost of labor will be included in qualifying deductions.

Ad-Hoc Data Format Subcommittee Report

Neymark summarized SubC meeting minutes of 1/28 (see Attachment D). The PC discussed proposed changes to 140-2004 for consistency with proposed rules for DOE Tools site posting. Knebel observed that the changes would add new requirements to the standard output reports and must therefore be an addendum.

Proposed Addendum b to 140-2004 (HVAC BESTEST Volume 2 cases)

See Chair announcements, publication of the addendum by ASHRAE is expected in February or March, with the next supplement/reprints of code intended standards.

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RP-865

David Yuill has done some work with field trials, and according to Haberl has identified some issues regarding compatibility of the test cases with whole-building energy simulation tools.

RP-1052

Adaptation should be doable.

Annex 42 Tests

These are a suite of test cases for modeling CHP systems including combustion-based systems and fuel cells. They are 98% complete, and include empirical validation cases. The test cases emphasize narrower aspects of the models, and Ian thinks they may be too esoteric (non-mainstream) to include in Standard 140 at this time.

“Wet” BESTEST

This IEA Annex 41 work relates to moisture absorption/desorption modeling of the thermal fabric, and will not be available for review until June 2008.

Investigate Possibility of ASHRAE Funding Research Projects for Standard 140

There are 2 areas where SSPC 140 could use help from ASHRAE research:

- Field testing (with simulation programs) existing test suites being considered for adaptation into Std 140, and modifying the test suites such that a greater variety of simulation programs can apply them
- Developing new test cases for Std 140

Update for IEA Task/Annex 34/43

Judkoff reported on IEA Task 34/43 activities. This new IEA research effort focuses on validation and testing of building simulation tools. The work is making progress, and is due for completion in late 2007. Some of this work could be included with Standard 140 in the future.

The following projects are included:

- Comparative Tests (Software-to-software comparisons)
 - Ground coupled heat transfer related to floor slabs. This includes analytical verification tests (NREL, US)
 - Multi-zone envelope test cases (NREL, US) including:
 - Analytical verification conduction test
 - The effect of shading on a window, where a shading device is affixed to the window of a neighboring zone
 - The effect of shading on a window by a neighboring zone of the building
 - Internal windows.
 - Airflow test cases including single- and multi-zone (INCT, Japan)
- Empirical Validation Tests (Compare software to empirical data)
 - Daylighting/shading/load interaction – EMPA (Switz.); ERS (Iowa)
 - Double-façade building – Aalborg U. (Denmark)
 - Mechanical equipment test cases - Dresden University of Technology (Germany):
 - Focusing on water-side components/systems: chillers, boilers, pumps, piping, valves, etc