

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 person listed below within 60 days following the meeting.)

TC/TG/TRG No. TC 4.7 DATE: June 29, 2004

TC/TG/TRG TITLE: Energy Calculations

DATE OF MEETING: June 27, 2004 LOCATION: Nashville

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS & ADDIT'L ATTENDANCE
Dru Crawlev (CHM)	2000			
Les Norford (VC)	2000			
Dan Fisher (SEC)	2002			
	2000	Vern Smith (RES)		
Jeff Haberl (PROG)	2002			
	2000	Jim Willson (APP)		
Bill Bahnfleth	2003			
Joel Neymark (SC)	2000			
	2000	Jan Hensen (INTL)		
	2003	Patrick Carpenter		
Phil Haves	2000			
Michael Brandemuehl	2003			
Tim McDowell	2002			
Rick Strand	2001			
Robert Sonderegger	2002			
Gren Yuill	2000			
Ian Beausoleil-Morrison	2000			
	2003	George Walton		
John Wright (INTL)	2003			

DISTRIBUTION

ALL MEMBERS OF THE TC/TG/TRG

TAC CHAIR	Mark C. Hegberg
TAC SECTION HEAD	Craig C. Wray
SPECIAL PUBLICATIONS LIAISON	Marilyn A Listvan
JOURNAL/INSIGHTS LIAISON	Harvey Sachs
STANDARDS LIAISON	Richard D. Hermans
HANDBOOK LIAISON	William S. Fleming
PROGRAM LIAISON	Peter Simmonds
RAC RESEARCH LIAISON	Michael J. Brandemuehl
ALI LIAISON	Douglas C. Hittle
TEGA LIAISON	Charles E. Gullledge III
STAFF LIAISON (RESEARCH)	Michael R. Vaughn
STAFF LIAISON (TECH SERVICES)	Michael R. Vaughn
STAFF LIAISON (STANDARDS)	Claire Ramspeck

ASHRAE TC 4.7 Energy Calculations

ANAHEIM MEETING

ACTION ITEMS

1. 1049-RP: **Motion** (Brandemuehl/haberl). The PMSC recommends the approval of RP1049 final report to TC 4.7 subject to minor revisions suggested by the PMSC and any interested TC 4.7 members who review the trial report. All comments must be sent to the PMSC by July 31, 2004 **approved (12-0-1) Chair not voting.**
2. 1197-RP **Motion** (Norford/Yuill)The PMSC recommends the approval of RP1197 final report to TC 4.7 subject to recommendation for approval by 8.11 and minor revisions suggested by the PMSC and any interested TC 4.7 members who review the trial report. All comments must be sent to the PMSC by July 31, 2004. **approved (12-0-1) Chair not voting.**

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TC/TG/TRG MEETING SCHEDULE				
LOCATION – past 12 months		DATE	LOCATION - planned next 12 months	
Anaheim		January 27, 2004	Orlando	
Nashville		June 29, 2004	Denver	
			February 8, 2005	
			June 28, 2005	
TC/TG/TRG SUBCOMMITTEES				
Function			Chair	
Simulation and Component Models			Ian Beausoliel-Morrison	
Applications			Jim Willson	
Data-Driven Modeling			Agami Reddy	
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		Strand/Fleming
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)
None
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	Email
Add to email list	Nashville June 2004	Anaheim January 2004	Kansas City July 2003	Chicago January 2003			
		X	X	X	Abushakra	Bass	abushakr@msoe.edu
	X	X	X		Anderson	J.R.	jrhazel@bellsouth.net
X	X				Armour	Steve	sbarmour@southernco.com
	X	X		X	Bahnfleth	Bill	wbahnfleth@psu.edu
	X	X	X	X	Barnaby	Chip	CBarnaby@wrightsoft.com
					Bauman	Fred	fbauman@uclink.berkeley.edu
	X	X		X	Beausoleil-Morrison	Ian	IBeausol@nrca.gc.ca
				X	Bradley	Brian	bbradley@nrca.gc.ca
	X	X		X	Brandemuehl	Mike	michael.brandemuehl@colorado.edu
				X	Braun	Jim	jbrown@ecn.purdue.edu
			X	X	Carpenter	J Patrick	pcarpenter@kling.us
			X		Chantrasrisalai	Chanvit	chanvit@okstate.edu
	X	X	X	X	Claridge	David	Claridge@esl.tamu.edu
	X	X	X	X	Crawley	Dru	Drury.Crawley@ee.doe.gov
	X	X	X		Degelman	Larry	larry@taz.tamu.edu
			X		Deng	Zheng	zhengd@okstate.edu
			X	X	Eldridge	David	dancingdavid@hotmail.com
		X			Ellis	Peter	peter_ellis@nrel.gov
	X	X	X	X	Fisher	Dan	DFisher@okstate.edu
				X	Fleming	Bill	flemg@aol.com
	X				Gawin	Dariuh	gawindar@p.lodz.pl
		X			Gardner	Carol	gems@teleport.com
		X			Gehlin	Sigge	gehlin@siki.se
	X				Gorwick	Susie	susan.gorwick@honeywell.com
		X			Gowri	Krishnan	k_gowri@pnl.gov
				X	Guan	Don	yzguan@ksu.edu
	X	X	X	X	Haberl	Jeff	JHaberl@esl.tamu.edu
					Haddad	Kamel	khaddad@nrca.gc.ca
			X		Haiad	Carlos	Carlos.haiad.sce.com
	X	X	X	X	Haves	Philip	PHaves@lbl.gov
			X	X	Hensen	Jan	j.hensen@tue.nl
		X	X	X	Huang	Joe	YJHuang@lbl.gov
				X	Judkoff	Ron	ron_judkoff@nrel.gov
			X		Klaassen	Curtis	curtk@energy.iastate.edu
			X		Kong	Weixiu	weixiu@okstate.edu

Present at TC 4.7 meeting?					Last name	First name	Email
Add to email list	Nashville June 2004	Anaheim January 2004	Kansas City July 2003	Chicago January 2003			
X	X		X		Koran	Bill	William.koran@honeywell.com
	X		X	X	Kosny	Jan	kyo@ornl.gov
			X		Krarti	Moncef	krarti@colorado.edu
				X	Kreider	Jan	
				X	Lawrie	Linda	Linda@lawrie.com
		X			Lebrun	Jean	J.lebrun@ulg.ac.be
		X			Levermore	Geoff	geoff.levermore@umist.ac.uk
X	X	X		X	Liesen	Richard	rliesen@uiuc.edu
X	X	X	X		Lisenbee	Larry	lrllisenb@southern.com
			X		Liu	Xiaobing	Xiaobin@okstate.edu
		X			Long	Nicholas	Nicholas_long@nrel.gov
	X				Luo	Dong	luod@utrc.utc.com
			X	X	MacCracken	Mark	mmaccracken@calmac.com
	X	X	X	X	McDowell	Tim	Mcdowell@tess-inc.com
	X	X	X	X	Neymark	Joel	neymarkj@msn.com
	X		X	X	Norford	Les	lnorford@mit.edu
				X	Parson	Jim	parsons@me.msstate.edu
		X			Pegues	Jim	james.f.pegues@carrier.utc.com
				X	Phillips	Duncan	Duncan@cedarmere.ca
	X	X	X	X	Pedersen	Curt	cpederse@uiuc.edu
	X				Radosevic	Marija	m.radosevic@bwk.tve.nl
		X			Ramirez	Bob	Bob.Ramirez@itron.com
	X	X	X	X	Reddy	T. Agami	reddyta@drexel.edu
				X	Rees	Simon	SJRees@okstate.edu
				X	Rode	Carsten	car@byg.dtu.dk
			X		Sahlin	Per	per.sahlin@equa.se
				X	Scheatzle	David	scheatzle@asu.edu
		X			Selkowitz	Steve	seselkowitz@lbl.gov
	X	X	X		Shirey	Don	shirey@fsec.ucf.edu
			X		Silvetti	Brian	bslivetti@calmac.com
		X	X	X	Smith	Vernon	VSmith@archenergy.com
	X	X	X	X	Sonderegger	Robert	Robert.sonderegger@itron.com
	X	X	X	X	Spitler	Jeffrey	Spitler@okstate.edu
	X	X	X	X	Strand	Rick	rkstrand@uiuc.edu
		X	X	X	Walton	George	GWalton@nist.gov
X	X				Wen	Jin	jinwen@drexel.edu
		X	X	X	Willson	Jim	jimwill@indy.net
	X	X	X	X	Wray	Craig	CPWray@lbl.gov
	X	X	X		Wright	Jonathan	J.A.Wright@lboro.ac.uk
			X		Xiao	Dongyi	xdongyi@okstate.edu
	X	X	X		Xu	Peng	pxu@lbl.gov
		X	X	X	Yuill	Gren	yuill@unomaha.edu
				X	Zhu	Daming	zdmhvac@yahoo.com

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

#	Title	Joint TC	Cognizant Subcommittee/ Contractor	PMSC	Dates / status
1049-RP	Building System Synthesis and Design	1.5	Sim/Comp Loughborough University Jonathan Wright	Curt Pedersen (chair), Ed Sowell, Dave Knebel, Ron Nelson (TC 1.5), Mike Brandemuehl (TC 4.6), Jan Hensen	WS: 1-20-98 (SF) Rec: 6-22-99 (Seattle) NCE: 7-31-03 (6-25-02) NCE: 3-1-04 (7-1-03) NCE: 8-31-04 (1-27-04) Final Report Approved (6-29-04)
1197-RP	Updated Energy Calculation Models for Residential HVAC Equipment	7.6	Sim/Comp U Colorado Michael Brandemuehl	Chip Barnaby (chair), Craig Wray, Brian Dougherty (TC 7.6)	WS: 2-8-00 (Dallas) Start: 1-02 NCE: 3-1-04 (7-1-03) Final Report Approved (6-29-04)
1051-RP	Procedures for Reconciling Computer-calculated Results with Measured Energy Data		Data Driven Models Drexel Univ., Agami Reddy	Robert Sonderegger (chair)	WS approved June 2003 Start: 12-03
1311-TRP	Improving Load Calculations for Fenestration with Shading Devices	4.1 (cognizant TC), 4.5	Sim/Comp Dru Crawley		Contractor selected 6-04 (Nashville)

Appendix 2**RESEARCH PLAN**

ASHRAE
Technical Committee 4.7 Energy Calculations
2004-2005 Research Plan
1 August 2004

TC 4.7 approved no new RTARs for consideration on the 2004-2005 Research Plan.

Title	TC Priority 2004-2005	Prior TC priority	Society status	TC Status	Comments	Subcom
Baselining Building Energy Use When Only Short-Term Data Are Available	1			RTAR in progress	Agami Reddy, Bass Abushakra	DDM
Technical and Usability Enhancements to the Energy Calculation Toolkits	0	1 (2003-2004)	RTAR 2004-19, accepted	WS draft in progress	Dan Fisher:	SCM
Development of a Procedure for Base-lining Energy Use at Large Central Plants	0	2 (2002-2003)	RTAR, prioritized	WS draft in progress	Moncef Krarti, Jeff Haberl: Need to find additional support	DDM
Procedures and Data for High-Performance Residential Design	0	1 (2002-2003)	RTAR, accepted	WS draft in progress	Mike Witte, Vern Smith	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
1093	Diversity Factors	TAMU, Haberl	Cincinnati, June 2001	Overview of Literature on Diversity Factors and Schedules for Energy and Cooling Load Calculations
987	Loads Toolkit	UIUC, Pedersen	Atlanta, January 2001	Pedersen, C.O., D.E. Fisher, R.J. Liesen, and R.K. Strand. 2003. "ASHRAE Toolkit for Building Load Calculations." ASHRAE Transactions 109(1). To be presented in Chicago, January 29, 2003
1052	Verification Test Suite	OSU, Spitler	Atlanta, January 2001	Rees, S.J., D. Xiao, and J.D. Spitler. 2002. "An Analytical Verification Test Suite for Building Fabric Models in Whole Building Energy Simulation Programs." ASHRAE Transactions. 108(1):30-41.
1145	Two- and Three-Dimensional Heat Transfer	Enermodal	Atlanta, January 2001	Carpenter, S.C., J. Kosny, and E. Kossecka. 2003. "Modeling Transient Performance of 2 and 3-D Building Assemblies: ASHRAE 1145-RP." ASHRAE Transactions 109(1). To be presented in Chicago, January 29, 2003
1093	Diversity Factors	TAMU, Haberl	Cincinnati, June 2001	Abushakra, B., D.E. Claridge and J.S. Haberl. "Electricity Diversity Profiles for Energy Simulation of Office Buildings;" "Electricity Diversity Profiles for Peak Cooling Load Determination in Office Buildings;" and "Overview of Literature on Diversity Factors and Schedules for Energy and Cooling Load Calculations." Submitted to ASHRAE December 27, 2001.
865	Accuracy Tests	UNO, TAMU	Honolulu, June 2002	Yuill, G.K. and J.S. Haberl. "Development of Accuracy Tests for Mechanical System Simulations."
1222	Nodal Models	MIT, Chen	Honolulu, June 2002	Two papers submitted to Int. J. of HVAC&R Research
1050	. Inverse Modeling TK	U Dayton, TAMU	Kansas City, June 2003	<i>Kissock,JK., J.S.Haberl D. E. Claridge,</i> "Inverse Modeling Toolkit - Numerical

				Algorithms"
1050	. Inverse Modeling TK	U Dayton, TAMU	Kansas City June 2003	<i>Haberl, J.S., A. Sreshthaputra, D. E. Claridge, J.K. Kissock,</i> "Inverse Modeling Toolkit - Applications"

Appendix 4
TC/TG/TRG SPONSORED SYMPOSIA

Current as of June 2004

PLANNED:

Denver/June 2005

Validation of building simulation programs through ASHRAE Standard 140 (Chaired by Ian Beausoleil-Morrison)

Recent Advances in Simulation (Chaired by Dan Fisher)

What to do When Data Misbehave? (Chaired by Agami Reddy)

Use of Simulation in the Design of Low Energy Buildings (Chaired by Ron Judkoff)

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

PAST:

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)

Kansas City, June-July 2003

Inverse Methods for Calculating Energy Savings from Energy Conservation Retrofits (Chair: Jan F. Kreider)

Coupling of Building Airflow and Energy Modeling Programs (Co-sponsored with TC4.10 Chair: Jelena Srebric)

Chicago, January 2003

Recent Advances in Energy Simulation: Building Loads (Co-sponsored with TC4.1/Chair: Jan Hensen)

Honolulu, June 2002

Recent Advances in the Thermal Simulation of HVAC Equipment (Co-sponsored by TC4.1/Chair: Ian Beausoleil-Morrison)

Atlantic City, January 2002

Tools and Techniques for Calibration of Component Models (TC1.5 sponsor; TC4.7 co-sponsor/Chair: Agami Reddy)

Cincinnati, June 2001

Better Inputs for Better Outputs (TC9.6 co-sponsor/Chair: Jim Willson)

Atlanta, January 2001

Analysis Tools for the Design of Low-Energy Cooling Systems (Chair: Joe Huang)

Minneapolis, June 2000

International Experience with Weather Data for Simulation and Design, Part 1: Simulation, Ventilation and Daylighting (TC 4.2 co-sponsor/Chair: Dru Crawley)

International Experience with Weather Data for Simulation and Design, Part 2: Simulation (TC 4.2 co-sponsor/Chair: Dru Crawley)

Seattle, June 1999

Applications of Heat and Mass Balance Methods to Energy and Thermal Load Calculations (Chair: Chip Barnaby)

Accuracy tests for simulation models (Chair: Mike Witte)

Appendix 5
TC/TG/TRG SPONSORED SEMINARS

Current as of June 2004

PLANNED:

Denver/June 2005

How and Why to Calibrate a Simulation to Measured Data (Chair: Agami Reddy)

Modelling of Residential Cogeneration Systems: IEA/ECBS Annex 42 (Chair: Ian Beausoleil-Morrison)

Orlando/January 2005

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

Application and Experiences With the New EnergyPlus Software (Chair: Dan Fisher)

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

PAST:

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)

Kansas City, June-July 2003

Successful Applications of Energy Simulation in Building Design (Chair: Vernon A. Smith)

Chicago, January 2003

Getting started in Building Simulation (Chair: Chip Barnaby)

Using Monitored Data for Solving Engineering Problems (Chair: Agami Reddy)

Atlantic City, June 2001

Commercial Use of Building Energy Simulation Software (Chair: Kamel Haddad)

Cincinnati, June 2001

A Review of State of the Art in Building Simulation Programs (Chair: Dru Crawley)

Atlanta, January 2001

Low-Energy Cooling Case Studies (Chair: Phil Haves)

Dallas - January 2000

ASHRAE's Software Toolkits for Energy Calculations (Chair: Dru Crawley)

ASHRAE TC 4.7 Energy Calculations
Tuesday, June 29, 2004, 6:00-8:30 p.m.
Jackson A/B; Gaylord OpryLand Convention Center
Nashville, Tennessee

1. Roll call and introductions Fisher

- Convened at 6:05 pm

2. Accept agenda & approve minutes of Kansas City meeting Crawley (Attachment A)

- Agenda accepted (Sonderegger/Norford 13-0-0 CNV)
- Minutes accepted (Haberl/Bahnfleth 13-0-0 CNV)

3. Announcements/Liaisons Crawley

- Craig Wray reported from TAC. Seminars will now be available on line.
- Mike Brandemuehl from RAC. RTAR evaluation flowchart being institutionalized as well as an algorithm by means of which RAC will evaluate RTARS. There are some slight modifications to the RTAR forms, which are available on the web. Tech. Council will no longer shoot down programs at the last minute, but RTARs will be scrutinized more carefully. RAC is also seeking nominations for the 'Service to Research' award.
- Crawley noted CLIMA 2005 call for papers. Abstracts Due Sept. 30, 2004.
- cheCrawley noted that minutes are due no later than 60 days after meeting and require 'draft' disclaimer.
- Crawley noted that ASHRAE is moving to a dedicated TC web server.
- Crawley noted that TC 4.7 is ahead of schedule; we just need to get the 'checklist' in
- Crawley noted that Research plans due August 1, 2004

4. Membership Crawley

- Les will be taking over as chair
- Rolling on Reddy, Rees (INTL), Huang, Griffith, Liu
- Rolling off Crawley, Beausoleil-Morrison, Haves, Smith, Willson, Degelman, Henson, Yuill
- Beausoleil-Morrison-Secretary, Haves-Chair of Simulation and Component Models

5. Subcommittee reports

5.1 Applications: Dan Fisher reporting: **(Attachment B)**

- Fisher reported

5.2 Data-Driven Modeling Agami Reddy (chair) reporting: **(Attachment C)**

- The committee has several RTARs for the consideration on the research plan
- 1051-TRP Procedures for Reconciling Computer-Calculated Results with Measured Energy Data (Sonderegger reporting) Contractor: Drexel University. Reported good progress, but having trouble getting data sets. Haberl suggested Predictor Shootout data set. Project is on track for completion by Orlando.

5.3 Simulation & Component Models Beausoleil-Morrison chair, Ian Beausoleil-Morrison reporting: **(Attachment D)**

- Ian Beausoleil-Morrison updated the committee on SCM research plan
- 1049-RP Building System Design Synthesis (Loughborough Univ) Pedersen reporting. RP-1049 (Curt Pedersen reporting) The project is complete; PMSC has final draft report. John Wright handed out summary of project. **(Attachment D1). Motion** (Brandemuehl/haberl)The PMSC recommends the approval of RP1049 final report to TC 4.7 subject to minor revisions suggested by the PMSC and any interested TC 4.7 members who review the trial report. All comments must be sent to PMSC by July 31, 2004
- 1197-RP Updated Energy Calc Models for Residential Equip. (UC-Boulder) (Barnaby reporting) Report is available in draft form. PI will **Motion** (Norford/Yuill)The PMSC recommends the approval of RP1197 final report to TC 4.7 subject to recommendation for approval by 8.11 and minor revisions suggested by

the PMSC and any interested TC 4.7 members who review the trial report. All comments must be sent to PMSC by July 31, 2004. Co-sponsoring committee, TC 8.1, has not voted on final report.

5.4 Research, Joe Huang reporting (Attachment E)

- TC 4.7 Research Plan Status: Some discussion on the Toolkit enhancement workstatement. This has already been approved as an RTAR. Fisher will collaborate with Lebrun to include expanded scope of toolkits for building operation and fault detection.
- Sonderegger presented an RTAR from Data driven models titled 'Owner-centered Building Energy DataMart'. Crawley: Include the magnitude of the problem? Deliverables include Procedures, Queries, and demonstration. Crawley recommended additional work. Committee supported work, but agreed that RTAR was not ready to go forward. Sonderegger will circulate work statement for comments.
- Reddy presented RTAR titled 'Baselining Building Energy User When Only Short-Term Data Are Available.' Bass Abushakra led discussion of RTAR. Haves supported the topic, but noted that the RTAR didn't explain the importance of baselining. Also noted that usually there is no choice on the monitoring time. Yuill and Reddy suggested editorial changes to clarify the meaning of 'available' data.
- Motion: (Yuill/Haves) Move that we put forward the RTAR 'Baselining Building Energy Use When Only Short-Term Data Are Available.' subject to editorial revisions. as our 2005 research plan **(12-0-0) CNV**
- Crawley noted that a contractor has been selected for RP1311 TRP Improving Load Calculations for fenestration with shading devices. Barnaby withdrew from the PMSC and was replaced by Crawley.

5.5 Handbook, Strand (chair) reporting (Attachment F)

- The handbook chapter has been submitted.
- Need a new handbook chair! Round of applause for chairman Strand!

5.6 Program, Haberl reporting (Attachment G)

- motion(haberl/strand) to accept the program prioritization for Orlando as shown in Attachment G: **approved (13-0-0) CNV**
- Haberl requested that those interested in feedback on Nashville program send him e-mail (jhaberl@esl.tamu.edu) for program statistics.

5.7 Standards, Neymark reporting (Attachment H)

SSPC 140 SMOT for Eval of Building Energy Analysis Computer Programs:

- Addendum A: Analytical verification cases for space cooling applications has been included in the standard. Publication approval required by ASHRAE board and ANSI.

IEA Annex 34/43 Test and Validation of Building Energy Simulation Tools

- Neymark reported

5.8 Web Site,

- new version of web site was developed by Rees and put up by Spittler.

6. Reports on related activities

6.1 GPC 20 XML Definitions for HVAC&R

- Chip Barnaby reporting
- Seminar and Forum may help committee get traction

6.2 TC 4.1 Load Calculations

- Chip Barnaby reporting
- 1311TRP on Fenestration underway.
- RP1199 residential load calculation method based on heat balance approved by committee

6.3 TC 4.2 Climatic Information

- Joe Huang reporting
- climate tables moved to CD with 4500 locations.

6.4 TC 4.5 Fenestration

- Curt Pedersen reporting
- noted conference Performance of Exterior Envelopes (Dec 5-10, 2004). Online registration at <http://www.ornl.gov/sci/buildings> For information email wagnerlw@ornl.gov

6.5 TC 6.5 Radiant Heating and Cooling

- Rick Strand reporting
- Strand and Simmons presented work statement to include radiant models in the loads toolkit.

- Motion(strand/sonderegger)(13-0-0) Move that TC 4.7 co-sponsor TC 6.5 work statement "Develop A Radiant System Module for the Simulation and Analysis of spaces and systems **approved (13-0-0) CNV**

6.5 TC 7.4 Building Operation Dynamics

- Mke Brandemuehl reporting
- Contractor selection on reducing operating costs through optimal use of building mass

6.6 TC 7.5 Smart Building Systems

- Les Norford reporting
- Drexel moving ahead on fault detection models on chillers

6.7 TC 7.6(9.6)Systems Energy Utilization

- no liaison

6.8 TC 2.8 Sustainability

- Crawley reporting. Green building guide sold out. Committee getting organized.
- Haberl noted that global warming committee working with TC 2.8

6.8 IAI International Alliance for Interoperability

- Phil Haves reporting
- IAI is now a subcommittee within NIBS (National Institute of Building Science)

6.9 IBPSA (USA, Canada, IBPSA, BS 2005)

- Phil Haves reported
- Les reported that SimBuild 2004 will be held in Boulder in August.
- Ian reported on successful ESim conference in Vancouver.

6. 10 IBPSA International

- Spittler reported on BS '05
- Call for papers: website is now accepting papers
- Contact Haberl for free IBPSA Proceedings.

7. Old Business

- No old business

8. New business

- Haberl requests that RP1093 and RP1050 be included in toolkit upgrade work statement
- Haberl requested that awards committee be reinstated in TC 4.7. Incoming chair will follow up.

10. Adjourn

Meeting adjourned 8:35 pm

Attachments

- A. Agenda
- B. Applications Subcommittee Minutes
- C. Inverse Methods 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 Agenda
Tuesday, June 29, 2004, 6:00-8:30 p.m.
Jackson A/B, Presidential Mezzanine
Nashville, Tennessee

- | | |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Roll call and introductions | Fisher |
| 2. Accept agenda & approve minutes of Anaheim meeting | Crawley |
| 3. Announcements/Liaisons | Crawley |
| 4. Membership | Crawley |
| 5. Subcommittee reports | |
| 5.1 Applications | |
| • Applications Research Wish List | |
| 5.2 Data-Driven Modeling | Reddy |
| • Data-Driven Modeling Research Wish List | Reddy |
| • 1051-RP Procedures for Reconciling Computer-Calculated Results with Measured Energy Data (Drexel Univ) | Sonderegger |
| 5.3 Simulation & Component Models | Beausoleil-Morrison |
| • Simulation & Component Models Research Wish List Update | Beausoleil-Morrison |
| • 1049-RP Building System Design Synthesis | Pedersen |
| • 1197-RP Updated Energy Calc Models for Residential Equip. | Barnaby |
| 5.4 Research | |
| • TC 4.7/ASHRAE Research Plan Status | Huang |
| • Section 4 Research Subcommittee Chairs Ad Hoc | Huang |
| • 1311-TRP Improving Load Calc for Fenestration with Shading Devices (TC 4.1) | Crawley |
| 5.5 Handbook | Strand |
| 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 | Rees |
| 6. Related activities reports | |
| • GPC 20 XML Definitions for HVAC&R | Haves/Barnaby |
| • TC 4.1 Load Calculation Data and Procedures | Barnaby |
| • TC 4.2 Climatic Information | Huang |
| • TC 4.5 Fenestration | Pedersen |
| • TC 6.5 Radiant Heating and Cooling | Strand |
| • TC 7.4 (4.6) Building Operation Dynamics | Brandemuehl |
| • TC 7.5 (4.11) Smart Building Systems | Norford |
| • TC 7.6 (9.6) Systems Energy Utilization | |
| • IAI International Alliance for Interoperability | Haves |
| • IBPSA: USA, Canada, IBPSA, BS 2005 | Norford/Beausoleil-Morrison, Spitler, Bernier |
| 7. Old Business | |
| 8. New business | |
| 9. Executive Session | |
| 10. Adjourn | |

TC 4.7 APPLICATIONS SUBCOMMITTEE
June 29, 2004, Tuesday 3:30 - 5:00
Nashville

The meeting was called to order by acting Applications Subcommittee chair, Dan Fisher at 3:30 pm.

In attendance:

Marija Radosevic	TV/E	m.radosevic@bwk.tue.nl
Ian Beausoleil-MNorrison	NRCAN	ibeausol@nrcan.gc.ca
Jeff Haberl	TAMU	jhaberl@esl.tamu.edu
Dan Fisher (acting chair)	Oklahoma State University	
Gren Yuill	UNL	yuill@unomaha.edu
Y Joe Huang	LBNL	YJHuang@lbl.gov
Tim McDowell	Thermal Energy System Specialists	mcdowell@tess-inc.com
Susie Gornick	Honeywell	susan.gornick@honeywell.com
Mingsheng Liu	UNL	mliu2@unl.edu
Chip Barnaby	Wrightsoft	cbarnaby@wrightsoft.com
Dru Crawley	DOE	drury.crawley@ee.doe.gov

DFisher called the meeting to order at 3:30

Introductions were made

Approval of minutes: There were no additions or amendments brought up, but these can be deferred till they come up.

DFisher then reviewed the list of Action Items provided by past subcommittee chair JWillson:

1) GYuill and TMcDowell said that they will be working on this on the "right away" timeline (rather than the "right before the next meeting").

2) Action item on draft WS for "Procedures and Data for High-Performance Residential Design". Nobody had any more information on this WS. It will push it to the Research section of the meeting.

Other Action Items were not discussed.

JHaberl then reviewed the current TC 4.7 program.

Reviewing the items originally for Nashville but rolled over to Orlando,

1. JHuang recommended that the seminar on "Simulations without tears" should be killed,
2. Forum "modeling phase change materials..." by Jan Kosny has not happened,
3. Forum "do ASHRAE members need an energy simulation models of refrigerated warehouses", by Jan Kosny may be moot because TC 10.5 did something on it already.

Reviewing the items currently scheduled for Orlando,

1. "Validation of building simulation program through ASHRAE Standard 140", to be chaired originally by JWillson; paper by IBeausoleil-Morrison has already been presented elsewhere, 3 other papers are still possible, Subcommittee decides to move it to Denver, and IBeausoleil-Morrison agreed to be the chair,
2. Seminar on "application and experiences with the new EnergyPlus software", DFisher agrees to be chair, GYuill has a paper.

JHaberl reviewed the other items currently on the program plan.

DFisher then moved the agenda to research.

1. DFisher asked if anyone has thoughts on the project, "Procedures and data for high performance residential design", by Vern Smith.
2. The consensus is that nothing has been done on this topic. IBeausoleil-Morrison suggested
3. that it be kept on the research list but not give it any priority.
4. Second item "methodology to define bounds of variability in building energy use predictions using detailed simulation models and how it can be incorporated in the design process", by Haddad and Wyndham-Wheeler. IBeausoleil-Morrison said it was proposed in a "time of weakness" and should be killed.
5. Third item "defining performance factors for primary and secondary equipment simulation inputs for commercial buildings", by Nall and Lebrun. JHuang said this has been around for years, but not acted upon. The consensus was to remove the item from the Research plan.
6. DFisher then reviewed the wish list for the Applications Subcommittee (see attached). JHaberl mentioned JDeringer's RTAR on improved window calculations in support of ASHRAE 90.1.
7. JHuang mentioned work in defining residential internal loads and proposed that the RTAR on standard residential operating conditions be resurrected. Several people thought this was a good idea, and suggested co-sponsorship by TC 9.5 Residential and Small Buildings, TC 5.12 Ventilation, and TC 4.1 Loads.

DFisher concluded that the action items for research are that

1. JHaberl will develop the RTAR with Joe Deringer,
2. JHuang will resurrect the previous RTAR on standard residential operating conditions with the new title is, "Representative Data for Residential Energy and Load Calculations".

TC 4.7 Applications Subcommittee
RESEARCH WISH LIST
June 2004, Nashville, Tennessee

1. Development of Enhanced Window Simulation Capability for Standard 90.1 prescriptive simulation. Jeff Haberl/Joe Derringer
2. Representative Data for Residential Energy and Load Calculations Joe Huang RTAR
3. Toolkit of Energy Conservation Measures for ASHRAE Standard 90.1 Energy Cost Budget Method.
4. Prototypical Buildings for use in ASHRAE Standard 90.1 Energy Cost Budget Method.
5. Standards Utility Rate Formatter and Converter for the common building energy simulation programs.
6. Sensitivity analysis on the Prototypical Buildings in Item #2 and the Toolkit ECM's in Item #1.
7. Demonstration Toolkit on building energy simulation use in building design for training and ASHRAE Handbook CD + uses. (Modeling – getting started – what's important.)

PROGRAM UPDATE

Haberl provided a program update (see Program Subcommittee Report for details of final update at main TC meeting). Programs to be submitted for the Nashville meeting must be into ASHRAE by Feb 13, 2004.

Three seminars from the Applications Subcommittee were scheduled for Nashville/June 2004 at the Kansas City meeting. These were discussed as follows.

1. “Applications of HVAC-01 Primary and Secondary Toolkits” chaired by Jean Lebrun. Lebrun did not attend this meeting, so the proposed seminar was postponed to Orlando/Jan 2005.
2. “Application and Experiences with the New EnergyPlus Software” chaired by Joe Huang. Joe did not recall volunteering to chair this symposium, so it will be postponed until Orlando without a designated chair.
3. “Simulation Without Tears” chaired by Joe Huang. This one will remained scheduled for Nashville.

A symposium titled “Validation of Building Simulation Programs through ASHRAE Standard 140 chaired by Jim Willson is scheduled for Orlando.

The meeting was adjourned shortly after 5 pm.

TC 4.7 Applications Subcommittee
RESEARCH WISH LIST
June 2004, Nashville, Tennessee

8. Development of Enhanced Window Simulation Capability for Standard 90.1 prescriptive simulation. Jeff Haber/Joe Derringer
9. Representative Data for Residential Energy and Load Calculations Joe Huang RTAR
10. Toolkit of Energy Conservation Measures for ASHRAE Standard 90.1 Energy Cost Budget Method.
11. Prototypical Buildings for use in ASHRAE Standard 90.1 Energy Cost Budget Method.
12. Standards Utility Rate Formatter and Converter for the common building energy simulation programs.
13. Sensitivity analysis on the Prototypical Buildings in Item #2 and the Toolkit ECM's in Item #1.
14. Demonstration Toolkit on building energy simulation use in building design for training and ASHRAE Handbook CD + uses. (Modeling – getting started – what's important.)

Minutes to TC 4.7 Data-Driven Modeling Subcommittee meeting

June 28, 2004, Monday 7:30 - 9:00

Nashville, TN

Attendance:

Les Norford , Rob. Sonderreger, Bass Abushakra, Jeff Haberl, Agami Reddy, Joe Huang, Bill Koran/Honeywell

The meeting was called to order by AReddy at 7:40, followed by introductions.
The minutes from the Jan 2004 meeting was approved.

AReddy jumped to discussions on Program.

- The seminar on "what to do when data misbehaves" was bumped from Nashville. It has been moved to Orlando (Jan 2005) and will be chaired by AReddy. Depending on audience interest, the same seminar can be repeated as a symposium in Denver June 2005.
- AReddy asked whether there are any suggestions for forums in Orlando. There was none.
- Robert suggested a symposium for Chicago on "building inverse models for optimal control", to be chaired by JHaberl, with contributions by RSonderreger, LNorford, possibly MAddison, .
- BAbushakra suggested a seminar for Denver on "how and why to calibrate ", to be chaired by RSonderreger, with contributions by AReddy, BAKushakra, possibly Liu/Claridge.

AReddy then moved the meeting to the discussion of RTARs.

- AReddy circulated an RTAR from TC 9.6 for consideration on "Development of Tools to Mine Building Data for Energy Efficiency Opportunities". The RTAR focuses on data mining of EMCS data. The conclusion of the Subcommittee was that the RTAR was more appropriate to another TC, such as TC 7.5.
- AReddy then circulated current RTARs under development:
 - 1) "Owner-centered Building Energy DataMart" (by RSonderreger). The Subcommittee approved the RTAR and recommended that RSonderreger present it to the full committee.
 - 2) "Characterizing Building Energy Use Over a Year from Short-Term Monitoring" (by BAbushakra). Several attendees made numerous suggestions on how to improve the RTAR. JHaberl agreed to help BAbushakra to tighten up the RTAR by the full meeting.
 - 3) "Determining Standard (Robust) Procedures for Filling Data Gaps Important for Energy Analysis" (by DClaridge). Intent of the RTAR to develop procedures for filling data gaps. JHuang mentioned there were many similarities of this RTAR to one in TC 4.2 authored by Huang on interpolating weather data. JHaberl suggested that JHuang meet with DClaridge at the fall meeting to discuss possibilities for merging the two RTARs.
 - 4) Subcommittee recommended that DClaridge be asked to flush out an RTAR on "Procedures for adjusting baseline models for M&V projects due to creep and other causes".
 - 5) got dropped.

**TC 4.7 Simulation and Component Models Subcommittee
Nashville Meeting Minutes
Monday, June 28 2004, 18h00 to 19h30
Opryland, Magnolia Mezzanine, Cheekwood A**

Introductions / Additions to agenda

Meeting called to order at 18h10. There were 30 attendees as shown in attachment 1.

Program

Nashville (June 2004)

- **Symposium** on *Modelling Moisture Sorption/Desorption by Building Materials* (Chaired by Jan Kosny).

Orlando (February 2005)

- **Seminar** on *Neglected Topics in Building Simulation*. This seminar will present results showing the significance of some of the factors (physical processes and data inputs) that we have taken for granted for years. Chaired by Ian Beausoleil-Morrison. Jeff Spitler will present on longwave radiation from external building surfaces. Tim McDowell will present on ground coupling. Mike Brandemuehl will present on residential cooling. Joe Huang will present on climate change. Curt Pedersen will present on internal surface convection.
- After discussion it was decided that the Seminar or Forum proposed by Jean Lebrun on how the primary and secondary toolkits could be updated and adapted for use in building commissioning and fault detection and diagnosis would not have sufficient attendance. Rather it was decided that Jean Lebrun and Dan Fisher should work their ideas for the toolkits into an RTAR that can be pitched to both this subcommittee and TC 7.4 (Building Operations Dynamics) by Orlando.

Denver (June 2005)

- **Symposium** on *Thermal Modeling of Phase Change Materials in Building Envelopes: Old problems, New Developments* (Chaired by Jan Kosny). This had been previously proposed as a forum but did not make in onto the program. Jan will attempt to assemble sufficient papers.
- **Symposium** on *Recent Advances in Energy Simulation* (Chaired by Dan Fisher). The call for abstracts has been issued. A number of authors have expressed interest. The challenge now is to turn that interest into papers by September.
- **Seminar or Symposium** on the use of simulation for designing low-energy buildings (Chaired by Ron Judkoff). At the last meeting Ron Judkoff and Dru Crawley agreed to decide whether to organize this as a seminar or a symposium. TC 2.8 and TC 7.1 should be interested in co-sponsoring. Neither was at this meeting to report: status unknown.

- **Seminar** on Modelling Residential Cogeneration Systems: IEA/ECBCS Annex 42 (Chaired by Ian Beausoleil-Morrison). Ian Beausoleil-Morrison will discuss the idea with the Annex 42 participants to determine whether enough of them will attend ASHRAE to put this seminar together.

Chicago (January 2006)

- Mike Brandemuehl and Ian Beausoleil-Morrison will select from amongst the papers presented at SimBuild 2004 and eSim 2004 to put together a symposium. The selected papers will be further developed and extended for this symposium.

Research Projects in Progress

1049-RP Design Synthesis

Curt Pedersen (PMSC chair) and Jonathen Wright (PI) presented a brief summary of the project. The draft final report has been submitted to the PMSC. The PMSC met Sunday and voted to accept the report final subject to a few editorial modifications. The August 31 contract deadline will be met. Jonathen Wright will submit up to three papers to the Research Journal but these will be presented in a seminar. Jonathen will provide a hand-out at Tuesday's TC 4.7 meeting summarizing the project.

1197-RP Updated Energy Calculation Models for Residential HVAC Equipment

Mike Brandemuehl (PI) gave an overview of the project's status. The draft final report has been submitted to the PMSC. The PMSC will meet tomorrow at 8h00 to discuss the report. The project is in the wrap-up stage.

Work Statements / RTARs in Progress

Models for Natural and Hybrid Ventilation

- This is a HIGHEST priority item on the research wish list.
- George Walton, Joe Huang, Paul Linden, and Mona Ahmed Fanny have been working on this.
- Although this item has been in the works for a few meetings, the progress has been slow mainly due to disagreements over the general direction of the work. There are different schools of thought, those that feel the project should focus on model development and those that feel it should focus on validation.
- Dave Banks reported that TC 4.10 has also worked a long time on an RTAR on natural ventilation. This was to use a CFD approach to predict the external wind pressures and the flow through openings. However, TC 4.10 has now abandoned this RTAR because it concluded that CFD has not yet developed to the point where this is feasible. TC 4.10 would like to find a more pragmatic way forward.
- Joe Huang distributed copies of an RTAR that he has been working on that attempts to address the various viewpoints.
- After considerable discussion it was agreed that Joe Huang, Dave Banks, and Phil Haves would develop the RTAR to the point where the subcommittee can have some more in-depth discussions.

This RTAR will consider the various viewpoints. They will solicit input from TC 5.12 (Ventilation and Infiltration) as well. This will be ready for Orlando.

- Which TC should be the primary sponsor is a secondary issue that can be discussed further next meeting.

Modelling Internal Surface Convection

- This is a HIGHEST priority item on the research wish list.
- Dan Fisher and Ian Beausoleil-Morrison have been working on an RTAR. Copies were distributed.
- Jeff Spitler suggested that we use the ASHRAE Handbook classification of room outlets.
- TC 4.5 (Fenestration) is interested in establishing convection coefficients for internal window surfaces.
- Curt Pedersen felt that slot diffusers were very important and therefore should be included in the scope of work.
- We need to better justify the need by presenting some numbers on the impact.
- After discussion it was agreed that Dan Fisher and Ian Beausoleil-Morrison will revise the RTAR based upon the comments made by the subcommittee and will discuss it with TC 4.5 and TC 4.1. The revised RTAR will be ready for Orlando.

Radiant Heating and Cooling

- This is a HIGHEST priority item on the research wish list.
- Rick Strand and Jan Kosny handed out a WS that TC 6.5 (Radiant Heating) has been working on for a long time. It has much in common with our project ideas. Rick Strand and Jan Kosny are involved in this WS.
- The TC 6.5 WS will result in toolkit extensions for radiant heating.
- Rick Strand and Jan Kosny are also representing the viewpoints of TC 4.7 SCM to ensure that this WS is consistent with our interests.

Moisture Absorption/Desorption by Building Materials and Furnishings

- This is a HIGHEST priority item on the research wish list.
- Time did not permit discussion of this item.
- Not much has happened the past few meetings.
- IEA / ECBCS Annex 41 is doing research in this area.
- Achilles Karagiozis and Andreas Holm, both participants in Annex 41, agreed to take a lead on this. They will present an RTAR for discussion at Orlando.

Adjourn

The meeting was adjourned at 19h30.

Attachment 1

Nashville	Anaheim	KC	Last Name	First Name	E-Mail
X			Banks	David	dbanks@cppwind.com
	X	X	Barnaby	Chip	cbarnaby@wrightsoft.com
X	X	X	Bass	Abushakra	abushakr@msoe.edu
X	X		Beausoleil-Morrison	Ian	ibeausol@nrca.gc.ca
	X		Bernier	Michel	michel.bernier@polymtl.ca
	X		Burkard	Tobias	tobias.burkard@gmx.de
X	X		Brandemuehl	Mike	michael.brandemuehl@colorado.edu
		X	Candsberl	Dennis	drcrm@aol.com
	X		Crawley	Dru	drury.crawley@ee.doe.gov
		X	Chanvit	Chantrasrisalai	chanvit@okstate.edu
		X	Charette	David	Charette.david@lte.ireq.ca
	X		Claridge	David	dclaridge@tamu.edu
		X	Cornish	Tracy	tcornish@taylor-engineering.com
		X	Deng	Zheng	zhengd@okstate.edu
		X	Deru	Michael	Michael_deru@nrel.gov
			Eldridge	David	dancingdavid@hotmail.com
X			Ellis	Peter	peter_ellis@nrel.gov
X	X	X	Fisher	Dan	d-fisher@uiuc.edu
X			Gawin	Dariujz	gawindar@p.lodz.pl
		X	Griffith	Brent	griffith@mit.edu
X	X	X	Haberl	Jeff	jhaberl@tamu.edu
X		X	Haves	Philip	phaves@lbl.gov
		X	Hern	Shawn	shhern@yahoo.com
X			Holm	Andras	holm@houi.ibp.fhg.de
X	X		Huang	Joe	YJHuang@lbl.gov
	X		Judkoff	R.	Ron_judkoff@nrel.gov
X			Karagiozis	Achilles	karagiozisan@ornl.gov
	X		Klaassen	Curt	curtk@energy.iastate.edu
		X	Kong	Weixiu	weixiu@okstate.edu
X		X	Kosny	Jan	kyo@ornl.gov
		X	Koran	William	William.koran@honeywell.com
	X	X	Krarti	Moncef	krarti@colorado.edu
		X	Khalifa	Hezzat	ez@ecs.syr.edu
		X	Kissock	Kelly	kkissock@udayton.edu
	X		Long	Nicholas	nicholas_long@nrel.gov
X	X		Liesen	Richard	r-liesen@uiuc.edu
	X		Levermore	Geoff	geoff.levermore@umist.ac.uk

Attachment D Simulation and Component

Models Subcommittee Minutes

TC 4.7 Minutes, Nashville

29 June 2004

Nashville	Anaheim	KC	Last Name	First Name	E-Mail
X		X	Liu	Xiaobing	xiaobin@okstate.edu
X			Maref	Wahid	wahid.maref@nrc-cnrc.gc.ca
X	X	X	McDowell	Tim	mcdowell@tess-inc.com
X			Mendes	Nathan	nmendes@ccet.pucpr.br
		X	Millette	Jocelyn	Millette.jocelyn@lte.ireq.ca
X	X	X	Neymark	Joel	neymarkj@sni.net
X		X	Norford	Les	lnorford@mit.edu
		X	Padhmanabhan	Sankar	padhman@okstate.edu
X	X	X	Pedersen	Curt	cpederse@uiuc.edu
	X		Ramirez	Bob	bob.ramirez@itron.com
X			Raposevic	Marija	m.radosevic@bwk.tue.nl
X		X	Reddy	T. Agami	Reddyta@drexel.edu
		X	Rees	Simon	SJRees@okstate.edu
		X	Shenoy	Arun	aruns@okstate.edu
X	X	X	Shirey	Don	shirey@fsec.ucf.edu
	X	X	Smith	Vernon	vsmith@archenergy.com
X		X	Sonderegger	Robert	rsonder@siliconenergy.com
	X	X	Sommer	Klaus	Klaus.sommer@fh-koeln.de
X	X		Spitler	Jeffrey	spitler@okstate.edu
X	X	X	Strand	Rick	r-strand@uiuc.edu
X			Tan	Liangoi	ltan@me.unlv.edu
		X	Tang	Kenneth	tangkenneth@hotmail.com
	X	X	Walton	George	gwalton@nist.gov
X	X	X	Wright	Jonathan	J.A.Wright@lboro.ac.uk
X		X	Yuill	Gren	yuill@unomaha.edu

ASHRAE
Research Committee 4.7 Energy Calculations
2004-2005 Research Plan
28 June 2004

Active projects

#	Title	Joint TC	Cognizant subcom / Contractor	PMSC	Dates / status
1049-RP	Building System Synthesis and Design	1.5	Sim/Comp Loughborough University Jonathan Wright	Curt Pedersen (chair), Ed Sowell, Dave Knebel, Ron Nelson (TC 1.5), Mike Brandemuehl (TC 4.6), Jan Hensen	WS: 1-20-98 (SF) Rec: 6-22-99 (Seattle) End: 7-31-04 (Nashville) NCE: 7-31-03 (6-25-02) NCE: 7-31-04 (7-1-03) Approved 6-29-04
1197-RP	Updated Energy Calculation Models for Residential HVAC Equipment	7.6	Sim/Comp Univ. of Colorado Mike Brandemuehl	Chip Barnaby (chair), Craig Wray, Brian Dougherty (TC 7.6)	WS: 2-8-00 (Dallas) Start: 1-02 End 8-31-04 ? Request NCE: 03-01-2003
1051-RP	Procedures for Reconciling Computer Calculated Results Against Measured Energy Data		DDM: Drexel University Agami Reddy	Robert Sonderegger (chair), Ron Judkoff, Vern Smith, Marlin Addison	WS: 7-1-97 (Boston) Start: 1-04

Projects in progress

#	Title	Joint TC	Champion(s) / PES	Committee	Dates / status
1311-TRP	Improving Load Calculations for Fenestration with Shading Devices	4.1 (cognizant TC), 4.5	Sim/Comp Dru Crawley		Contractor selected 6-04 (Nashville)

Accepted RTARs ,Work Statements in progress

Title	Champion(s)	Ranking	Dates/status
		Accepted RTAR, not prioritized 2003-40	

Additional TC 4.7 RTARs and WSs in Process – status as of 29 June 2004

Title	TC Priority 2004-2005	Prior TC priority	Society status	TC STATUS	Lead/ Comments	Subcom & Priority
Technical and Usability Enhancements to the Energy Calculation Toolkits				RTAR accepted, assigned number 2004-19, WS not developed	Dan Fisher	SCM-1
Models for Natural and Hybrid Ventilation				New RTAR draft under development, co-sponsorship with 4.10 and 5.12	Joe Huang, Phil Haves, TC 4.10 representative (Don ?)	SCM-1
Internal Surface Convection Modeling				RTAR under development	Dan Fisher, Ian Beausoleil-Morrison	SCM-2
Assess impact of explicit modeling of radiant heating and radiant cooling and devise appropriate modelling strategies				RTAR under development	Rick Strand, Jan Kosny	SCM-3
Moisture absorption/desorption by building materials and furnishings				Draft RTAR distributed for comment Jun-03	Jan Kosny, Mike Brandemuehl	SCM-4
Create algorithms to allow mapping of manufacturer's or available data to simulation inputs				?	Milorad Bojic, Bruce Billedeaux, Mike Brandemuehl	SCM-5
Technical and Usability Enhancements to the Energy Calculation Toolkits				RTAR 2004-19 accepted	Dan Fisher	SCM-6
Energy Performance Simulation Model for Refrigerated Warehouses				?	Jan Kosny, Joe Huang	SCM-7
Development of a Procedure for Baseline Energy Use of Large Central Plants				RTAR accepted but not assigned number; WS returned from RAC, needs to be revised and resubmitted.	Agami Reddy, Moncef Krarti, Jeff Haberl	DDM-1

Attachment E

Research Subcommittee Minutes

TC 4.7 Minutes, Nashville

29 June 2004

Owner-centered Building Energy DataMart				RTAR approved by SC Jun-04, returned to author by full committee for modifications.	Robert Sonderegger	DDM-2
Characterizing Building Energy Use Over a Year from Short-Term Monitoring				RTAR approved by SC Jun-04	Agami Reddy, Bass Abushakara	DDM-3
Determining Standard (Robust) Procedures for Filling Data Gaps Important for Energy Analysis				Incomplete RTAR, recommend co-sponsorship with TC 4.2 Weather Info.	Dave Claridge, Joe Huang	DDM-4
Procedures for adjusting baseline models for M&V projects due to creep and other causes				Incomplete RTAR	Dave Claridge	DDM-5
Procedures and Data for High-Performance Residential Design				Accepted RTAR, not prioritized 2003-40	Tim McDowell,	A-1
Development of a Procedure for Baseline Energy Use of Large Central Plants				RTAR accepted but no number; WS returned from RAC, needs to be revised and resubmitted.	Agami Reddy, Moncef Krarti, Jeff Haberl	A-2
Improved window calculations for ASHRAE 90.1				RTAR under development, co-sponsorship with 4.5 and ASHRAE 90.1	Jeff Haberl, Joe Deringer	A-3
Representative Data for Residential Energy and Load Calculations				RTAR under development, co-sponsorship with 4.5, 5.2	Joe Huang, Danny Parker, Chip Barnaby	A-4
Toolkit for energy conservation measures for ASHRAE Standard 90.1				No RTAR, on hold		A-5
Prototypical buildings for use in ASHRAE Standard 90.1				RTAR to be developed	?	A-6
Standard utility rate description format and converter for common energy simulation programs				RTAR to be developed	?	A-7
Sensitivity analyses on prototypical buildings and toolkit of common energy conservation measures				RTAR to be developed	?	A-8
Demonstration toolkit on building energy simulation for training and ASHRAE chapter use (Getting started - what's important)				RTAR to be developed	?	A-9

SCM = Simulations and Component Models

DDM = Data Driven Modeling (formerly Inverse Methods)

A = Applications

ASHRAE TC4.7 HANDBOOK SUBCOMMITTEE NOTES
Nashville

The handbook chapter has been completed. The subcommittee did not meet.

**TC 4.7 program plan
Nashville ASHRAE Meeting
June 29th, 2004**

NASHVILLE/JUNE 27TH-30TH, 2004

Symposium

“Modeling Moisture Sorption/Desorption by Building Materials”
Organized by TC 4.7 (Sim and Comp Models)
Chaired by Jan Kosny
Status: New

SCHEDULED FOR ORLANDO/FEBRUARY 5-9TH, 2005 (PACKAGES DUE 8/6/2004)

Seminar #1

“What to do When Data Misbehave?”
Organized by TC 4.7 (Data Driven Models)
Chaired by Agami Reddy
Status: New (contributions by Claridge, Sonderegger, Gillespie, Elleson)

Seminar #2

“Application and Experiences With the New EnergyPlus Software”
Organized by TC 4.7 (Applications)
Chaired by Dan Fisher
Contributions by (Yuill, Haves, Pedersen, Crawley)

Seminar #3

“Neglected Topics in Building Simulation”
Organized by TC 4.7 (Simulation and Component Models)
Chaired by Ian Beausoleil-Morrison
Status: New
Contributions: (Spitler, McDowell, Huang, Brandemeuhl, Pedersen)

Scheduled for Denver/June 25-29th, 2005

Symposium

“Validation of building simulation programs through ASHRAE Standard 140”
Organized by TC 4.7 (Applications)
Chaired by Ian Beausoleil-Morrison
Status: 3 papers being considered (865-RP Yuill & Haberl), Standard 140 & HVAC Bestest Experience (McDowell), Standard 140 & TRNSYS/EnergyPlus Experiences (Witte, Henniger)

Symposium

“Recent Advances in Simulation”
Organized by TC 4.7 (Sim and Comp Models)
Chaired by Dan Fisher
Status: New

Symposium

“What to do When Data Misbehave?”
Organized by TC 4.7 (Data Driven Models)
Chaired by Agami Reddy
Status: New (contributions by Claridge, Sonderegger, Gillespie, Elleson)

Attachment G

Program TC 4.7 Minutes, Nashville

29 June 2004

Symposium

“Use of Simulation in the Design of Low Energy Buildings”

Organized by TC 4.7 (Sim. and Com. Models)

Co-sponsored by TC 2.8 & 7.1

Chaired by Ron Judkoff

Status: New

Symposium

“Thermal Modeling of Phase Change Materials in Building Envelopes: Old Problem, New Developments”

Organized by TC 4.7 (Sim. and Com. Models)

Chaired by Jan Kosny

Status: New

Seminar

“How and Why to Calibrate a Simulation to Measured Data”

Organized by TC 4.7 (Data Driven Models)

Chaired by Agami Reddy

Status: New (contributions by Claridge/Liu, Sonderegger, Abushakra)

Seminar

“Modelling of Residential Cogeneration Systems: IEA/ECBS Annex 42”

Organized by TC 4.7 (Sim. And Com. Models)

Chaired by Ian Beausoleil-Morrison

Status: New

Scheduled for Chicago/January 27-31st, 2006

Symposium

“Inverse Models From Simulation for Optimal Control”

Organized by TC 4.7 (Data Driven Models)

Chaired by Jeff Haberl

Status: New (contributions by Sonderegger, Norford, Reddy, Addison)

Quebec City/June 24-28th, 2006

Dallas/January 27-31st, 2007

Long Beach/June 23-27th, 2007

Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs, Summary of Nashville meeting 6/29/04.

PUBLICATION OF ADDENDUM “A” TO STANDARD 140-2001

Addendum “a” adds the HVAC BESTEST E100-series cases to Standard 140. These are analytical verification test cases for space cooling equipment.

- Addendum ‘a’ Publication approvals
 - SSPC 140 approved publication via letter ballot on March 18, 2004.
 - Standards Committee publication approval on June 26, 2004
 - Goes to the ASHRAE Board on 7/1/04
 - Goes to ANSI after that.

Continuous Maintenance for Standard 140 was approved at Anaheim

- This was done because the PC anticipates that addenda will be published more often than once every four years.

Addition of new test procedures (as addenda):

- Furnace BESTEST: NRCan (Beausoleil-Morrison) submitted drafts to the 140 Chair (Judkoff) and VC (Neymark). Comments have been submitted back to Ian; he agreed to incorporate these comments before submittal to the full PC
- HERS BESTEST: FSEC (Fairey) reports that code adaptation of that is near completion. After HERS BESTEST is incorporated into 140, it is possible for the International Energy Conservation Code (IECC) to reference that procedure via 140.

UPDATE FOR IEA TASK/ANNEX 34/43

This new IEA research effort focuses on validation and testing of building simulation tools. The work is mostly in its early stages. 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 and basements – this project is a carry-over from Task 22 and is currently further along than the others
- Multi-zone envelope test cases including single- and multi-zone air flow
- Empirical Validation Tests (Compare software to empirical data)
 - Daylighting/shading/load interaction – EMPA (Switz.); ERS (Iowa)
 - Double-façade building – FIBP (Germany); Aalborg U. (Denmark)
 - Mechanical equipment test cases:
 - To focus on water-side: chillers, pumps, etc
 - More specifics to be determined