

TC/TG/TRG MINUTES COVER SHEET

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

TC/TG/TRG NO.: TC 4.1 DATE: September 8, 2012

TC/TG/TRG TITLE: LOAD CALCULATION DATA AND PROCEDURES

DATE OF MEETING: January 23, 2012 LOCATION: Chicago, IL

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
<b>Voting</b> Chris Wilkins Rolando Legarreta Chip Barnaby Steve Bruning Dan Fisher Glenn Friedman Doug Hittle Suzanne LeViseur Jim Pegues Larry Sun  <b>Non-Voting</b> Curt Pedersen Stephen Roth Som Shrestha Gary Wingfield	2008 2008 2010 2008 2011 2009 2011 2011 2008 2008	<b>Voting</b> [none]  <b>Non Voting</b> Bob Doeffinger Jeff Spitler Branislav Todorovic Lucy Armankwah David Ariyo Andrew Braum Jui-Chen Roger Chang Charlie Curcija Joe Ferdleman John Filler Nick Gmitter Martin Gough Robert Hopper Stephen Kavanaugh Ken-Ichi Kimura Larry Lisenbee James Norman Brian Rock Thomas Romine, Jr. Arun Veda		<b>Visitors</b>  Ahmad Sleiti Kevin Wood

DISTRIBUTION:

All Members of TC/TG/TRG

ADDITIONAL DISTRIBUTION:

TAC Chairman: Charles H. Culp, III  
 TAC Section Head: Michael R. Bilderbeck  
 Chapter Tech Transfer: Harris M. Sheinman  
 Research Liaison: Dr. Srinivas Garimella  
 ALI/PDC: John H. Nix, II  
 Special Publications: William S. Fleming  
 2013 HB Fundamentals: Peter Simmonds, PhD  
 Standard Liaison: James R. Tauby, P.E.  
 Manager of Standards: Stephanie C. Reinche  
 Staff Liaison: Michael R. Vaughn

These minutes have been approved by vote of Technical Committee 4.1 on June 25, 2012.

**January 23, 2012**  
**Committee Meeting Minutes (Approved)**  
**TC4.1 Load Calculations Data and Procedures**  
**Chicago, IL**

1. Meeting called to order by Chris Wilkins at 2:25pm
2. Roll Call
  - a. 10 of 10 voting members present. Quorum is present.
3. Introductions
4. Approval of June 2012 Montreal Meeting Minutes.
  - a. Motion to approve: Jim Pegues.
  - b. Seconded: Rolando Legarreta, Suzanne LeViseur
  - c. Vote: 10-0-0-0.
5. Liaison Reports  
[No liaison's attending]
6. Research Chair Report
  - a. RP-1416 - Convection Coefficients
    - Project completed
    - Data produced by project is difficult to use. PMS met and identified a solution to the usability issues.
    - Results will go into HOF Chapter 15 (Fenestration) and will supply the means of adjusting U-values for windows.
    - A section will also be provided in HOF Chapter 19 (Energy Estimating) with more detailed discussion and a bibliography.
    - TC 4.7 (Energy Estimating) is expected to approve and close the project at this meeting.
    - Consider including results of this project in Load Calculation Application Manual revision (RP-1616).
  - b. RP-1613 - Design Weather Data
    - Steve Bruning reports this project is well along.
    - Project includes revision of solar factors used in the clear sky solar model.
    - Data is to be submitted 4/30/2012 for inclusion in our HOF Chapter 18 (Non-Residential Loads).
  - c. RP-1616 - Revise Load Calculation Application Manual
    - TC 4.1 met in executive session to consider a motion to accept the Project Evaluation Subcommittee recommendation to approve the bid submitted by Oklahoma State University (Jeff Spitler)
    - Action Item: Have a TC 4.1 representative attend the RAC meeting held 7am,-10am Wednesday to support the recommendation. Jim Pegues to reach out to Research Liaison to see if this is possible. Gary Wingfield is available to attend the meeting.

- d. Future Research - RTAR for Research on Plenum Design Factors
  - Will focus on ceiling plenums, attics and underfloor plenums.
  - Previous work by TC 4.7 is on hand as a starting point (RP-787). Chris Wilkins to track down this material.
  - TC 5.3 (Room Air Distribution) is currently working on underfloor plenum issues.
- e. Future Research - Double-Skin Facades
  - Conference Paper session on this subject is scheduled for San Antonio
  - Use these papers as a starting point for research on the subject.
- f. Future Research - Kitchen Ventilation (TC 5.10)
  - Undertaking a new project to determine heat gains and radiative/convective splits for unhooded kitchen appliances. This includes toasters, panini presses, convection ovens.
  - Results would be placed in our HOF Chapter 18 (Non-Residential Loads).
  - Steve Bruning proposes TC 4.1 express interest in co-sponsoring the research.
  - Place this on the agenda for the summer meeting in San Antonio to approve co-sponsorship and appointment of a liaison.

7. Program Chair Report (Glenn Friedman)

*Chicago Winter Meeting - January 2012*

- a. Seminar 41 - Mobile Applications for Load Calculations - To be
  - To be held Tuesday, 3:15pm
  - Includes three presentations and then a roundtable discussion.

*San Antonio Summer Meeting - June 2012*

- b. Conference Paper on Dual Facades
  - Status of this session is currently unclear.
  - Larry Sun noted the TC can request to sponsor a Conference Paper session as long as papers have been submitted first. Not known if these papers have been submitted.
  - Glenn Friedman will proceed with this session for San Antonio.
- c. Seminar on Equipment Sizing using Energy Modeling versus Design Tools
  - Speakers: Steve Bruning (Design Analysis), Dan Fisher (Energy Modeling), Jeff Spitler (Comparative Analysis)
  - Chip Barnaby: May be worth asking TC 4.7 if it has interest in co-sponsoring this seminar. Dan Fisher will take this to TC 4.7. also propose including eQuest in this.
  - Concept: Engineers have begun using energy modeling tools like EnergyPlus or eQuest to determine peak loads for equipment sizing. Explore the pros and cons of this approach versus using tools that apply the traditional design analysis principles for estimating peak loads.

*Programs for Future Meetings*

- d. Review of Ideas for Future Programs
  - Non-uniform surface temperatures (e.g., UFAD, radiant floor heating)
  - Zoning
  - Ventilation and infiltration
  - How load calculations interact with other ASHRAE Handbook Chapters
  - Legal and business risks of load calculations, with TC 1.7 (Business, Management and General Legal Education).
  - Forum on the standard of care for load calculations
  - Diversity factors for design day schedules
- e. Mini-Conference (Suzanne LeViseur)
  - Concept: 11 to 12 programs can be bundled as a mini-conference within an ASHRAE meeting.
  - One TC manages it.
  - MTG (Multidisciplinary Task Group) may be best positioned to organize because it can coordinate across TCs.
  - Larry Sun: Proposed having YEA co-sponsor with this with TC 4.1. Larry will advise on how to start this process.
  - Conclusion: Give thought for future programs and revisit this as a long term project as it involves a large amount of coordination. Look at a timeframe 2 years out.
- f. Non-Uniform Surface Temperatures (further discussion)
  - Steve Bruning: This seminar idea is larger than just UFAD. It also includes radiant floor heating systems and stratified rooms. In general includes the effect of thermal radiation on load calculations.
  - This seminar could be done in conjunction with publication of the UFAD Manual. That should occur by Winter 2013 Meeting. At that point its material could be used in a seminar.
  - Conclusion: Revisit as a program for the Dallas meeting in January 2013.

*General*

- g. Motion: Approve the program initiatives and priorities discussed above
  - Motion by: Doug Hittle
  - Seconded by: Larry Sun
  - Vote: 10-0-0-0
- h. TC 4.1 is in the top 20 in ASHRAE for contributions to ASHRAE programs.

8. Standards Chair Report (Glenn Friedman)
  - a. SPC 203 - MOT / Determining Heat Gain of Office Equipment Used in Buildings
    - Committee is still lacking sufficient "producer" members.
    - Cannot qualify for ANSI consensus status if producers are lacking.
    - Moving forward with plan to release a draft for advisory public review. Hoping this will spark manufacturers interest in joining the committee and participating.
9. Handbook Chair Report (Steve Bruning)
  - a. Have reached deadline for the 2013 Handbook of Fundamentals
  - b. Will distribute final drafts prior to June meeting in San Antonio
  - c. Will vote at June meeting to approve draft.
  - d. Submission required by July 12 (Residential Chapter) and July 19 (Non-Residential Chapter)
  - e. Review of remaining tasks for Non-Residential Chapter
    - Nomenclature - Key material - Stephen Roth
    - Equation Summary - Key material - Jim Pegues
    - References - Steve Bruning
    - UFAD - Gary Wingfield and Fred Bauman
    - Example Problem - Steve Bruning
10. Web Site (Chris Wilkins)
  - a. ASHRAE has revised its logo. The new logo needs to be used on the TC website. Chris will forward information to Jim Pegues for implementation.
11. Old Business

*Committee Roster Update*

  - a. Voting members rolling off on June 30, 2012.
    - Chris Wilkins
    - Larry Sun
    - Jim Pegues
    - Steve Bruning
  - b. Voting member special case
    - Rolando Legaretta will remain a voting member. Even though his 4 years a voting member are up June 30, because he becomes TC chairman at that time he gains two more years as a voting member.
  - c. Proposed voting members rolling on
    - Bob Doeffinger
    - Som Shrestha
  - d. In addition Bob Doeffinger will roll on as secretary, and will roll off as research subcommittee chairman. Chris Wilkins will roll on as research chair.

13. New Business

- a. *Tributes to Lynn Bellinger, ASHRAE Past President, who passed away on October 19, 2011. Lynn began her ASHRAE career in TC 4.1 and many TC 4.1 members knew her from her time on the committee.*

Steve Bruning: This is a great loss and a huge tragedy. I knew Lynn for 35 years. Lynn started her ASHRAE career in TC 4.1. At the first meeting she attended the secretary had resigned and Lynn was pressed into service. "You're a woman," the TC chair told her, "would you like to do this?" Lynn bit her lip and accepted. What followed was a long association with TC 4.1 during which Lynn turned this committee around. This is both a personal and a professional loss.

Gary Wingfield: I first met Lynn Bellenger at an APEC meeting in 1982. She was a wonderful person and I will miss her terribly.

Chris Wilkins: I worked closely with her during the year she was president.

Chip Barnaby: Lynn was tremendously supportive of SPC 205P and the IBPSA SimBuild conference. She attended and stayed for the entire conference.

- b. Gary Wingfield announced he is resigning but will remain as a corresponding member. This will be his last ASHRAE meeting.

14. Adjournment

- a. Motion to adjourn: Doug Hittle  
b. Vote: 9-0-0-0.

Attachments:

Meeting Agenda  
Program Sub-Committee Report  
Attendance Sign-in Sheet  
TC 4.1 Roster as of 7/1/2011.



**ASHRAE** American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.

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**Agenda for - TC4.1 Load Calculation Data & Procedures**

**Chicago**  
**January 23, 2012**

**TC4.1 Load Calculation Data and Procedures**  
**Monday, 2:15 PM to 4:15 PM**  
**Salon 12, Palmer Hilton Hotel**

- |  |                      |
|--|----------------------|
| 1. Call to Order   | Chris Wilkins        |
| 2. Roll Call   | Jim Pegues           |
| 3. Introduction of Visitors                                | Chris Wilkins        |
| 4. Approval and/or Corrections to Montreal Meeting Minutes | Chris Wilkins        |
| 5. Liaison Comments  |                      |
| Section Head   | Michael Bilderbeck   |
| Chapter Technology Transfer                                | Harris Sheinman      |
| Research   | Pradeep Kumar Bansal |
| Handbook   | Peter Simmonds       |
| ALI/PDC  | John Nix             |
| Programs   | -                    |
| Standards Liaison  | James Tauby          |
| Staff-Research/Tech Services                               | Michael R. Vaughn    |
| Staff-Standards  | Stephanie Reiniche   |
| 6. Research Subcommittee Report                            | Robert Doeffinger    |
| 7. Programs Subcommittee Report                            | Glenn Friedman       |
| 8. Standards Subcommittee Report                           | Glenn Friedman       |
| 9. Handbook Subcommittee Report                            |                      |
| Residential Chap 17  | Chip Barnaby         |
| Non-Residential Chap 18                                    | Steve Bruning        |
| 10. ASHRAE Website for TC 4.1                              | Jim Pegues           |
| 11. Old Business   | Chris Wilkins        |
| 12. New Business   | Chris Wilkins        |
| 13. Adjournment  | Chris Wilkins        |



## Meetings

### **TC 4.1 Load Calculation Data and Procedures**

**Monday 2:15-4:15p (Salon 12, Palmer Hilton Hotel)**

*Sponsoring:*

*Seminar 41: Loads on the Move: Mobile Apps*

*Tuesday 3:15-4:45p (Crystal)*

### **TC 4.1 Handbook**

**Sunday 3:00-4:00p (Sandburg 6)**

### **TC 4.1 Research**

**Sunday 4:00-5:00p (Sandburg 6)**

### **TC 4.1 Programs & Standards**

**Sunday 5:00-7:00p (Sandburg 6)**

### **TC 4.1 TRP-1616 PES**

**Monday 1:30-2:00 (Salon 12)**

Introduction of officers and voting members for 2012:

Chris Wilkins	Chair	Voting
Rolando Legarreta	Vice Chair	Voting
James Pegues	Secretary	Voting
Steven Bruning	Handbook Subc Chair	Voting
Robert Doeffinger, Jr	Research Subc Chair	Non-Voting
Glenn Friedman	Stds/Prog Subc.Chair	Voting
Chip Barnaby		Voting
Dan Fisher		Voting
Doug Hittle		Voting
Suzanne LeViseur		Voting
Larry Sun		Voting

**TC 4.1 Meeting, Programs Minutes**  
**Chicago, January 23, 2012**

Glenn Friedman, Program Chair

1. Current Programs

a. *Chicago Seminar 41: Loads on the Move: Mobile App, Tuesday at 3:15 pm*

1. SEMINAR

- Speaker #1: Chip Barnaby
- Speaker #2: Stephen Roth
- Speaker #3: Oliver Davis
- Speaker #3: Larry Sun

2. Future Programs

a. San Antonio, June 23-28

b. Deadlines

- Feb. 13 — Seminar, Forum, TPS and CPS Program Proposals Due
- Feb. 13 — Technical Papers Final Reviews
- Mar. 7 — Final Technical Papers Due/Final Conference Papers Due
- Mar. 16 — Notifications of Seminar and Forum Accept/Reject Distributed
- Mar. 30 — Conference Papers Accept/Reject Notifications
- May 4 — Upload of PPTs Begin
- June 4 — All PPTs Due Online
- June 23, 2012 — Speaker's Lounge Opens

c. San Antonio

2. Conference Paper Session Proposal

a. Dual Façade with Branko Todorovic and international papers

b. Larry Sun says we can sponsor a session with a chair.

c. Discussion agreed to continue as previously directed by TC4.1.

3. Seminar Session Proposals

a. New ideas:

i. RECOMMENDATION: Why can't I use the energy model peak to size my equipment? TC4.1 and TC4.7 smack down or shoot out. Comparison. "Why do I have to run things twice?" Could follow up with Mitchell Swam standard of care.

a. Cooling

b. Heating

2. Load Calculation, Steve Bruning

3. eQuest and/or Energy Plus (Dan Fisher will ask his students if the model will be ready), Dan Fisher

4. Results/Comparison, Jeff Spittler

Co-sponsor with TC4.7. Dan Fisher and Chip Barnaby will talk to TC4.7.

Title: ~~Why run things twice? Can't an energy model give loads?~~ **Run things twice? Loads and Energy Models**

A good topic to ask TC4.7 to do is an Energy Plus/eQuest smack down.

Motion by Doug Hittle, with second by Larry Sun. Accept item i., above. Passed unanimously.

**TC 4.1 Meeting, Programs Minutes**  
**Chicago, January 23, 2012**

- ii. Non-uniform surface temperatures. The UFAD manual could co-sponsor this with their manual. Target one year away in Dallas.
  - 1. Radiant floors
  - 2. Stratified spaces
  - 3. UFAD
- b. Old Ideas
  - i. Load Calculations Process Flow from Zoning through selection
  - ii. Zoning
    - 1. Space loads
    - 2. Air side
    - 3. Refrigeration side
    - 4. The Art of Zoning
      - a. Zoning criteria
    - 5. Modeling results for poor zoning
  - iii. What is the difference between energy modeling and load calculations
    - 1. Design day
    - 2. TMY file versus handbook approach
    - 3. Peak load (combined with TC4.7 to explore the difference, this could be a good one hard session)
  - iv. Ventilation and infiltration
  - v. How Load Calculations Interact with Other ASHRAE Chapters
    - Weather
    - Infiltration
    - Building skin color
    - Ventilation
    - Fenestration, dynamic windows
  - vi. TC1.7 Legal/Business Practices Risks of Loads Calc Codes Being so Hidden
  - vii. Forum on what is the Standard of Care for load calculations. Standard of Care. Mitchell Swan.
  - viii. Design day schedules, diversity factors
- c. Discussed creating a mini-conference for something like interacting with different sections of the Handbook. Good for a winter meeting in Dallas. Do a design process.
  - i. Weather
  - ii. Loads
  - iii. Fenestration
  - iv. TC7.1
  - v. Equipment selection
  - vi. Energy model
  - vii. Ducts
  - viii. Etc.

Might get YEA be the overseeing body for this. Larry Sun offered to help Glenn figure out who to talk to about this.

TC 4.1 Sign-In Sheet - Chicago - January 2012

	2010		2011		2012		Name	Status	Affiliation	E-mail
	Jan	Jun	Jan	Jun	Jan	Jun				
1	X	X	X	X	X		Chris Wilkins	Voting	Hallam-ICS	<a href="mailto:cwilkins@hallam-ics.com">cwilkins@hallam-ics.com</a>
2	X	X	X	X	X		Rolando Legarreta	Voting	Alegro Engineering	<a href="mailto:rlegarreta@alegro-engineering.com">rlegarreta@alegro-engineering.com</a>
3	X	X	X	X	X		Jim Pegues	Voting	Carrier	<a href="mailto:james.f.pegues@carrier.utc.com">james.f.pegues@carrier.utc.com</a>
4	X	X	X	X	X		Steve Bruning	Voting	Newcomb & Boyd	<a href="mailto:sbruning@newcomb-boyd.com">sbruning@newcomb-boyd.com</a>
5	X	X	X	X	X		Bob Doeffinger	Non-Voting	ZMM Inc	<a href="mailto:rcd@zmm.com">rcd@zmm.com</a>
6	X	X	X	X	X		Glenn Friedman	Voting	Taylor Engineering	<a href="mailto:gfriedman@taylor-engineering.com">gfriedman@taylor-engineering.com</a>
7	X	X	X	X	X		Doug Hittle	Voting	Hittle LLC	<a href="mailto:hittle@colostate.edu">hittle@colostate.edu</a>
8	X	X	X	X	X		Chip Barnaby	Voting	Wrightsoft	<a href="mailto:cbarnaby@wrightsoft.com">cbarnaby@wrightsoft.com</a>
9	X	X	X	X	X		Curt Pedersen	Non-Voting	University of Illinois	<a href="mailto:cpederse@uiuc.edu">cpederse@uiuc.edu</a>
10	X	X	X	X	X		Jeff Spittler	Non-Voting	Oklahoma State Univ	<a href="mailto:spitler@okstate.edu">spitler@okstate.edu</a>
11	X	X	X	X	X		Larry Sun	Voting	Tsuehaya Kaino Sun & Carter	<a href="mailto:lsun@tkscengineering.com">lsun@tkscengineering.com</a>
12		X			X		Suzanne LeViseur	Voting	Haddad Engineering	
13				X	X		Dan Fisher	Voting	Oklahoma State University	<a href="mailto:d.fisher@okstate.edu">d.fisher@okstate.edu</a>
14							David Ariyo	Non-Voting	Kwara State Polytechnic	
15							Nick Gmitter	Non-Voting	DLB Assoc	
16	X	X	X	X	X		Som Shrestha	Non-Voting	Oak Ridge National Laboratory	<a href="mailto:shresthas@ornl.gov">shresthas@ornl.gov</a>
17							Lynn Bellenger	Non-Voting	Pathfinder Engrs & Arch	<del>REMOVE</del>
18							Andrew Braum	Non-Voting	ASB Engineering	
19							Roger Chang	Non-Voting		
20							Charlie Curcija	Non-Voting	U of Massachusetts	
21							Joe Ferdelman	Non-Voting	Heapy Engineering	<del>REMOVE</del>
22							John Filler	Non-Voting	Trane	
23							Martin C Gough	Non-Voting	IES Ltd	
24							Robert Hopper Jr.	Non-Voting	Bridgers & Paxton Cons. Engr.	<del>REMOVE</del>

25					Stephen Kavanaugh	Non-Voting	U of Alabama	
26					Ken-Ichi Kimura	Non-Voting	Intl Research Inst on Human Env	
27					Larry Lisenbee	Non-Voting	Alabama Power	
28					James Norman	Non-Voting		
29					Brian Rock	Non-Voting	U of Kansas	
30					Tom Romine, Jr.	Non-Voting	Romine Romine & Burgess	
31	X	X	X	X	Stephen Roth	Non-Voting	Carmel Software Corp.	sroth@carneisoft.com
32				X	Branislav Todrovic	Non-Voting	University of Belgrade	
33					Arun Veda	Non-Voting	Efficiency Vermont	
34		X	X	X	Gary Wingfield	Non-Voting		
35			X	X	Peter Elton	Guest	MMM Group Ltd	
36			X	X	Roy Hubbard	Guest	Johnson Controls	
37			X	X	Chandan Sharma	Guest	Florida Solar Energy Center	
38			X	X	Chad Taylor	Guest	ETC Group	
39				X	Bob Howe	Guest	Carrier Corporation	
40				X	John Wright	Guest	University of Waterloo	
41				X	Mo Hosni	Guest	Kansas State University	
42				X	Wendell Humpres	Guest	Moses Engineers	
43				X	Ahmad Sleiti	8098137	U of North Carolina - Charlotte	asleiti@uncc.edu
44				X	Kevin Woods	3030495	Black & Veatch	wood.kc@bv.com
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## LOAD CALCULATION DATA AND PROCEDURES - T-TAC-TC04.01

## CHAIR/ALI COORDINATOR

3030489 111 Voting  
Term in Position: 07/01/2009 to 06/30/2012

**Mr Christopher K Wilkins, PE**

Hallam-ICS  
38 Eastwood Dr Ste 200  
S Burlington, VT 05403-4403  
Phone: (802)658-4891 Fax: (802)658-1457  
Email: cwilkins@hallam-ics.com

## Vice Chair

2045660 072 Voting  
Term in Position: 07/01/2009 to 06/30/2012

**Mr Rolando Legarreta, PE**

Alegro Engineering L P  
4150 Rio Bravo St Ste 238  
El Paso, TX 79902-1054  
Phone: (915)533-0700 Fax: (915)533-2929  
(22)  
Email: rlegarreta@alegro-engineering.com

## SECRETARY/WEBMASTER

5011825 010 Voting  
Term in Position: 07/01/2011 to 06/30/2012

**Mr James F Pegues**

Carrier Corporation  
PO Box 4808  
Rm 400A Tr-4  
Syracuse, NY 13221-4808  
Phone: (315)432-6526 Fax: (860)998-0292  
Email: james.f.pegues@carrier.utc.com

## Handbook Subcommittee Chair

96120 032 Voting  
Term in Position: 07/01/2008 to 06/30/2012

**Mr Steven F Bruning**

Newcomb & Boyd  
303 Peachtree Center Ave NE Ste 525  
Atlanta, GA 30303-1277  
Phone: (404)730-8400 Fax: (404)730-8401  
Email: sbruning@newcomb-boyd.com

## Research Subcommittee Chair

187002 128 Non-voting  
Term in Position: 07/01/2011 to

**Mr Robert Doeffinger, PE**

ZMM Inc  
222 Lee St W  
Charleston, WV 25302-2225  
Phone: (304)342-0159 Fax: (304)345-8144  
Email: rcd@zmm.com

## STANDARDS/PROGRAM SUBC. CHAIR

2000944 082 Voting  
Term in Position: 07/01/2009 to 06/30/2013

**Mr Glenn Friedman**

Taylor Engineering  
1080 Marina Village Pkwy Ste 501  
Alameda, CA 94501-1142  
Phone: (510)263-1542 Fax: (510)749-9136  
Email: gfriedman@taylor-engineering.com

## Member

2012220 999 Voting  
Term in Position: 07/01/2010 to 06/30/2014

**Mr Charles S Barnaby**

Wrightsoft  
131 Hartwell Ave  
Lexington, MA 02421-3105  
Phone: (781)862-8719 Fax: (781)861-2058  
Email: cbarnaby@wrightsoft.com

## Member

2045832 068 Voting  
Term in Position: 07/01/2011 to 06/30/2015

**Dr Daniel E Fisher, PhD**

Oklahoma State University  
Dept Of Mech & Aero Engr  
218 Engineering N  
Stillwater, OK 74078-5016  
Phone: (405)744-5900 Fax: (405)744-7873  
Email: dfisher@okstate.edu

## Member

326538 073 Voting  
Term in Position: 07/01/2011 to 06/30/2015

**Dr Douglas C Hittle**

Hittle LLC  
2640 S County Road 23  
Fort Collins, CO 80526-4756  
Phone: (970)229-9403 Fax: (206)350-5314  
Email: hittle@colostate.edu

## Member

433789 034 Voting  
Term in Position: 07/01/2011 to 06/30/2015

**Ms Suzanne LeViseur, PE**

Haddad Engineering, Inc.  
2955 Hartley Rd Ste 205  
Jacksonville, FL 32257-6284  
Phone: (904)483-2884 Fax: (904)262-7139  
Email: sleviseur@haddadeng.com

## LOAD CALCULATION DATA AND PROCEDURES - T-TAC-TC04.01

Member  
5013551 105 Voting  
Term in Position: 07/01/2008 to 06/30/2012

**Mr Larry Sun**

Tsuchiyama Kaino Sun & Carter  
17911 Von Karman Ave Ste 250  
Irvine, CA 92614-4243  
Phone: (949)756-0565 Fax: (949)756-0927  
Email: lsun@tkscengineering.com

Corresponding Member  
8132064 085 Non-voting  
Term in Position: 07/01/2011 to

**Mrs Lucy Amankwah, PE**

URS  
75 Commerce Valley Drive East  
Markham, ON L3T 7N9 CANADA  
Phone: 9058824401 (203) Fax:  
Email: lucyamankwah@gmail.com

Corresponding Member  
8008687 501 Non-voting  
Term in Position: 07/01/2011 to

**Mr David O Ariyo**

PO Box 6541  
Ilorin Kwara State, 011234 NIGERIA  
Kwara State Polytechnic  
Phone: 2348038369608 Fax:  
Email: davidariyo@yahoo.com

Corresponding Member  
52758 011 Non-voting  
Term in Position: 07/01/2010 to

**Mrs Lynn G Bellenger, PE**

Pathfinder Engineers & Architects LLP  
134 Fitzhugh St S  
Rochester, NY 14608-2205  
Phone: (585)325-6004 Fax: (585)325-6005  
(105)  
Email: lbellenger@pathfinder-ea.com

CORRESPONDING MEMBER  
5082748 006 Non-voting  
Term in Position: 07/01/2005 to

**Mr Andrew S Braum**

A.S.B Engineering PC  
1924 Bellmore Ave  
North Bellmore, NY 11710-5641  
Phone: (516)785-4200 Fax: (516)785-9148  
Email: asb@frigidyne.com

CORRESPONDING MEMBER  
8096056 007 Non-voting  
Term in Position: 07/01/2005 to

**Mr Jui-Chen Roger Chang**

155 Avenue Of The Americas 13th Fl  
New York, NY 10013-1507  
Phone: (212)897-1323 Fax: (212)229-1057  
Email: rchang@wrldesign.com

CORRESPONDING MEMBER  
2033343 004 Non-voting  
Term in Position: 07/01/1995 to

**Dr D. Charlie Curcija**

Lawrence Berkeley National Laboratory  
1 Cyclotron Rd  
Ms 90-3111  
Berkeley, CA 94720-8099  
Phone: (510)495-2602 Fax: (510)486-4089  
Email: dccurcija@lbl.gov

Corresponding Member  
2051726 041 Non-voting  
Term in Position: 07/01/2009 to

**Mr Joseph S Ferdelman, PE**

Heapy Engineering  
1400 W Dorothy Ln  
Dayton, OH 45409-1310  
Phone: (937)224-0861 Fax: (937)224-5777  
Email: jferdelman@heapy.com

CORRESPONDING MEMBER  
5218545 148 Non-voting  
Term in Position: 07/01/2005 to

**Mr John M Filler, Jr, P.E.**

Trane  
101 William White Blvd  
Pueblo, CO 81001-4869  
Phone: (719)585-4355 Fax: (719)585-4314  
Email: mfiller@trane.com

Corresponding Member  
8162163 007 Non-voting  
Term in Position: 07/01/2011 to

**Mr Nick Gmitter**

DLB Associates  
625 Industrial Way W  
Eatontown, NJ 07724-2303  
Phone: (732)774-2000 Fax:  
Email: ngmitter@dlbassociates.com

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## CORRESPONDING MEMBER

8053931 502 Non-voting  
Term in Position: 07/01/2005 to

**Mr Martin C Gough**

4 Highlands Rd  
Buckingham, MK18 1PL UNITED KINGDOM  
IES Ltd  
Phone: 1280822218 Fax: 1415528371  
Email: martin.gough@iesve.com

## CORRESPONDING MEMBER

2020067 057 Non-voting  
Term in Position: 07/01/2003 to

**Dr Stephen P Kavanaugh**

University Of Alabama  
16856 Fulmar Ln  
Northport, AL 35475-2572  
Phone: (205)348-1649 Fax: (205)348-6419  
Email: skavanaugh@eng.ua.edu

## CORRESPONDING MEMBER

391122 506 Non-voting  
Term in Position: 07/01/2005 to

**Dr Ken-Ichi Kimura**

13-21 Enoki-Cho  
Tokorozawa, 359-1104 JAPAN  
Intl Research Inst On Human Environment  
Phone: 81429246717 Fax: 81429246730  
Email: ken1kimuro@nifty.com

## CORRESPONDING MEMBER

2011543 057 Non-voting  
Term in Position: 07/01/2006 to

**Mr Larry R Lisenbee**

Alabama Power Company  
600 18th St N  
Birmingham, AL 35203-2206  
Phone: (205)257-4320 Fax: (205)257-4302  
Email: lrlisenb@southernco.com

## Corresponding Member

571050 052 Non-voting  
Term in Position: 07/01/2011 to

**Dr Curtis O Pedersen, PhD**

12197 Indian River Trl  
Hastings, MN 55033-8544  
Univ Of Illinois  
Phone: (612)325-0660 Fax: (217)244-6534  
Email: cpederse@uiuc.edu

## Corresponding Member

8140623 082 Non-voting  
Term in Position: 07/01/2011 to

**Ms Gabrielle Powell**

PO Box 770000 Mc N6g  
San Francisco, CA 94177-0001  
Phone: Fax:  
Email: gepf@pge.com

## CORRESPONDING MEMBER

2026715 053 Non-voting  
Term in Position: 07/01/2003 to

**Mr Brian A Rock, PhD, PE, FASHRAE**

The University of Kansas  
Ceae Dept, Arce Program  
1530 W 15th St 2150 Learned Hall  
Lawrence, KS 66045-7608  
Phone: (785)864-3603 Fax: (785)864-5631  
Email: hvacman@ku.edu

## CORRESPONDING MEMBER

629100 070 Non-voting  
Term in Position: 07/01/2003 to

**Mr Thomas B Romine, Jr**

Romine Romine & Burgess  
300 Greenleaf St  
Fort Worth, TX 76107-2316  
Phone: (817)336-4633 Fax: (817)336-1682  
Email: thosromine@aol.com

## CORRESPONDING MEMBER

8001393 082 Non-voting  
Term in Position: 07/01/2006 to

**Mr Stephen B Roth, PE**

Carmel Software Corp  
1050 Northgate Dr Ste 54  
San Rafael, CA 94903-2544  
Phone: (415)225-6030 Fax: (214)242-2639  
Email: stephenroth@gmail.com

## Corresponding Member

8049255 114 Non-voting  
Term in Position: 07/01/2011 to

**Dr Som S Shrestha**

109 Tiffany Pl  
Oak Ridge, TN 37830-6699  
Oak Ridge National Laboratory  
Phone: (515)509-4646 Fax:  
Email: shresthass@ornl.gov

## LOAD CALCULATION DATA AND PROCEDURES - T-TAC-TC04.01

## Corresponding Member

2008042                      068                      Non-voting  
 Term in Position:                      07/01/2011 to

**Dr Jeffrey D Spitzer**

Oklahoma State Univ

218 Engineering N

Stillwater, OK 74078-0001

Phone: (405)744-5900                      Fax: (405)744-7873

Email: spitzer@okstate.edu

## Corresponding Member

745308                      176                      Non-voting  
 Term in Position:                      07/01/2009 to

**Dr Branislav B Todorovic, PhD**

Koste Racina 6

11000 Belgrade, SERBIA67775 SERBIA

University Belgrade

Phone: 381112667775                      Fax: 381113370364

Email: todocob@eunet.rs

## CORRESPONDING MEMBER

8083891                      Non-voting  
 Term in Position:                      07/01/2006 to

**Mr Arun Veda**

Efficiency Vermont

255 S Champlain St Ste 7

Burlington, VT 05401-4786

Phone: (888)921-5990                      Fax:

Email: aveda.veic.org

## Corresponding Member

806355                      034                      Non-voting  
 Term in Position:                      07/01/2009 to

**Mr Gary L Wingfield, PE**

3943 Heath Rd

Jacksonville, FL 32277-2166

Phone:                      Fax:

Email: glwingfi@comcast.net

## TAC Chairman

159455                      064                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2012

**Dr Charles H Culp, III**

4577 Sandpiper Cv

College Sta, TX 77845-8768

Texas A&amp;M University

Phone: (979)458-3600                      Fax: (979)862-2457

Email: cculp@tamu.edu

## Section Head

62705                      056                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2015

**Mr Michael R Bilderbeck**

The Pickering Firm

6775 Lenox Center Ct Ste 300

Memphis, TN 38115-4435

Phone: (901)734-5502                      Fax: (901)272-6912

Email: mbilderbeck@pickeringfirm.com

## Chapter Technology Transfer

5077138                      032                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2014

**Mr Harris M Sheinman**

2396 Flintshire Ct

Dunwoody, GA 30338-5911

Heery International

Phone: (404)946-2116                      Fax:

Email: hsheinma@heery.com

## Research Liaison

5079153                      506                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2013

**Dr Pradeep Kumar Bansal**

87 Gillies Avenue

Epsom

Auckland, 1123 NEW ZEALAND

The University Of Auckland

Phone: 006493737599                      Fax: 006493737479  
(88176)

Email: p.bansal@auckland.ac.nz

## ALI/PDC

2027538                      036                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2012

**Mr John H Nix, II**

Florida Power &amp; Light Co

9250 W Flagler St

Miami, FL 33174-3414

Phone: (305)552-3657                      Fax: (305)552-2487

Email: john.h.nix@fpl.com

## Special Pubs

231957                      035                      Non-voting  
 Term in Position:                      07/01/2011 to 06/30/2012

**Mr William S Fleming**

Jacwill Svcs

543 Johns Pass Ave

Madeira Beach, FL 33708-2368

Phone: (727)641-7275                      Fax:

Email: flemg@aol.com

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## 2013 HB FUNDAMENTALS

3034387 084 Non-voting

Term in Position: 07/01/2009 to 06/30/2013

**Mr Peter Simmonds, Phd**

IBE Consulting Engineers

14130 Riverside Dr

Sherman Oaks, CA 91423-2313

Phone: (818)377-8220 Fax: (818)377-8230

Email: peter.simmonds@ibece.net

---

## Standard Liaison

2032527 006 Non-voting

Term in Position: 07/01/2009 to 06/30/2013

**Mr James R Tauby, PE**

Mason Industries Inc

350 Rabro Dr

Hauppauge, NY 11788-4257

Phone: (631)348-0282 Fax: (631)348-0279

Email: jtauby@mason-ind.com

---

## MANAGER OF STANDARDS

8031830 Non-voting

Term in Position: 07/01/2009 to

**Mrs Stephanie C Reiniche**

ASHRAE

1791 Tullie Cir NE

Atlanta, GA 30329-2305

Phone: (404)636-8400 Fax: (404)321-5478

Email: sreyniche@ashrae.org

---

## STAFF LIAISON/RESCH/TECH SVCS

7966801 650 Non-voting

Term in Position: 07/01/2001 to

**Mr Michael R Vaughn**

ASHRAE

1791 Tullie Cir NE

Atlanta, GA 30329-2305

Phone: (404)636-8400 Fax: (404)321-5478

Email: mvaughn@ashrae.org

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