

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

1791 TULLIE CIRCLE, NE/ATLANTA, GA 30329
404-636-8400

TC/TG/TRG MINUTES COVER SHEET

TC/TG/TRG No. TC5.6

DATE: July 26, 2006

TC/TG/TRG/TITLE: Control of Fire and Smoke

DATE OF MEETING: June 26, 2006

LOCATION: Quebec City, PQ

VOTING MEMBERS PRESENT	YEAR APPT'D	VOTING MEMBERS ABSENT	YEAR APPT'D	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
John Clark	2004	Sudhir Agrawal	2002	David Banks, CM
Dick Graves	2005	David Elovitz	2002	James Buckley, CM
John Klote	2002	Roger Lichtenwald	2004	Darryl Cann, Guest
Paul Miclea	2003	Ray Sinclair	2002	C W Chow, Guest
Jeffrey Tubbs	2005			Larry Felker, CM
Paul Turnbull	2005			Colleen Guest, CM
Bob Van Becelaere	2003			George Hadjisophocleous, CM
Robert Wasilewski	2005			Kai Kang, CM
William Webb	2002			Ahmed Kashef, CM
				Jerry Kettler, Guest
				Gary Loughheed, CM
				Valentina Nedelcu, Guest
				Tim Orris, CM

DISTRIBUTION

<i>All Members of TC/TG/TRG plus the following:</i>	
TAC Section Head:	Richardson Gaylon
TAC Chair:	Groll Eckhard
Committee Liaisons:	Harvey Brickman Michael Circosta Julian De Bullet Kimball Ferguson John Hogan Frederick Kohloss Alan Veeck
Manager of Standards:	Claire Ramspeck (Staff)
Manager of Research & Technical Services:	Mike Vaughn (Staff)

These draft minutes have not been approved and are not the official, approved record until approved by this committee.

MINUTES
ASHRAE TC 5.6
CONTROL OF FIRE AND SMOKE
Quebec City, PQ
June 26, 2006

Prepared by: Jeffrey Tubbs
Associate Principal
Arup
1500 West Park Drive
Suite 180
Westborough, MA 01581
Tel (508) 616-9990 ext. 16
Fax (508) 616-9991
Email jeff.tubbs@arup.com

1) Introduction:

The Committee Chair Paul Turnbull called the meeting to order at 4:15 pm.

2) Identification of Voting Members:

Voting members were identified to assist in voting procedures. Nine of thirteen members were present at the beginning of the meeting.

3) Minutes of Previous Meeting:

The minutes of the previous meeting (Chicago – January 2006) were distributed and approved.

4) Chair's Remarks

Paul Turnbull welcomed the members and guests and reminded the committee that roster changes take affect after the meeting. Paul reviewed the following from the chair meeting:

- CLIMA 2007 is looking for papers for presentation at their meeting in Finland in June 2007. Paul noted that if anyone is interested, he can provide more details.
- ASHRAE will be launching a new website on July 1. This website will have a new search engine that is google-based.
- ASHRAE has established new rules for determining a quorum for committees. Any "two-way synchronous conversation" counts as a member in attendance, this will allow members can call in to a meeting on a conference call and be considered as being in attendance for purposes of determining a quorum.

Paul discussed that ASHRAE is looking for volunteers from this TC and others to assist with the Solar Decathlon competition. ASHRAE is a title sponsor of this event, where 20 college teams will build energy-efficient solar homes and display them on the Washington Mall. Volunteers would answer technical questions from the design teams that cannot be answered by the design team or their advisors. Two or three people are needed to respond to any questions that may arise from these students.

Paul noted that the second edition of the ASHRAE Green Guide is almost complete. Changes include: a new chapter on IAQ, a new chapter on LEED for Mechanical Engineers, new Green Tips specific to building types, and revision and relocation of the commissioning chapter (moved

to the front of the design process chapter), as well as consolidation of additional chapters. Paul noted that he has download information and instructions. TC 2.8 is looking for comments by July 10.

Paul noted that ASHRAE is looking for feedback on the new program format and timeslots. Please send comments to paul.

5) Subcommittee Reports:

a) Research

The program chair, Bill Webb reported the following.

Research Projects Overview

- **RP1247 (Balcony Spill Plumes).** The test work has been completed. Papers for presentation in Dallas have been submitted to Mike Vaughn. The first draft of the report has been reviewed. NRC is planning to submit the final revised report by early August so that a letter ballot of the TC can be returned before the RAC meeting October 7.
- **RP1300 (Maximum Velocity of Make-Up Air in Atrium Smoke Control Applications).** The project has been awarded to Carleton University. The objective of this project is to conduct CFD modeling to evaluate the existing criterion of make-up air velocity and to determine if the 200 fpm (1 m/s) make-up air velocity limit is valid, or whether other values or methods are appropriate, and to gain an understanding of the mechanisms of smoke flow in atria when an air jet impacts a smoke plume

All planned simulations with the fire at a distance of 25% of the total width from the opening are complete. Results have been analyzed to determine the impact of make-up air velocity on the smoke plume and the hot layer. More simulations are under way with the fire at different locations.

A no cost extension request was made for this project to September 30th 2006. This request will allow the contractor to finish all planned simulations and to perform a number of additional simulations to better understand the impact of make up air velocity on the conditions in the atrium.

The contractor expects to submit draft report by September 30th, 2006 and vote for acceptance at the TC meeting in Jan 2007.

- **RP1328 (Develop Algorithms for Smoke Movement Modeling in Large, Multi-Compartment Buildings).** The Project has been awarded to NRC. Currently, designers of Smoke Control systems are forced to use multiple tools for fire growth and contaminant dispersion in a back-and-forth approach, using the results from one tool as the input to the next, then the results from the second back into the first, etc. to completely model multi-compartment buildings. This project is to develop an algorithm that could be incorporated into a single design tool that would be able to model smoke movement through multi-compartment buildings.

Long Range Research Plan

- **Stairwells and Open Doors.** This WS has been assigned as RTAR 1447 and has been

returned with comments and a request for response. John Klote will draft the response. From RP 1203, we learned that the pressurization air in the stairwell dilutes combustion products in the stairway significantly even with the stair door on the fire floor open. Because of the current limitation of computer models, this information needs further study. The algorithm project should develop a tool that can be used for this, but a large scale fire project would help to develop supporting data. The result for this project would be that there is a high probability that we will learn that we do not need to design stairwell pressurization systems to maintain pressure when doors are open.

- **Long Atria.** We know almost nothing about the how long an atrium can be before the smoke exhaust approach is no longer applicable. The question is how long an atrium can be before the smoke in the upper layer tends to fall to the floor. Considering the significance of heat transfer for the mechanisms involved, scale modeling is inappropriate. A project involving full scale fires would be appropriate. Gary Lougheed will review existing publications on the subject.
- **The effect of stack effect on smoke control systems.** What is the impact of reverse stack effect on natural venting smoke exhaust designs? At what point should stairwells be divided into multiple compartments to control stack effect? While this topic is of interest, a literature search would need to be performed to determine whether sufficient data already exist to answer these questions, or if a research project is required to develop the data.

Other topics include plugholing and the effects of pressure on elevator doors.

b) Program

Program subcommittee Chair John Klote reported on the following issues.

Program Deadline

- The deadline for completed program packages for the Dallas meeting is August 4, 2006.
- The deadline for Tech papers to be reviewed for the Long Beach Meeting is September 29, 2006.
- The deadline for completed program packages for the Long Beach meeting is February 9, 2007

Reminder for Program Moderators

When submitting program packages, program moderators are reminded to ask for a specific time slot and a backup time slot. Usually Sunday mornings are good times.

Planned Programs

John noted the following list of planned programs. It should be noted that the names listed below are only possible speakers or authors.

1. **Transaction Session, Dallas January 2007: Balcony Spill Plumes**
Bill Webb – Program Moderator

- a. Experiments – Gary Lougheed
- b. CFD Modeling Entrainment and the Spill Edge – George Hadjisophocleous
- c. Zone Modeling & Analytical Modeling – Gary Lougheed
- d. CFD Modeling Overall - McCartney

Note: The papers were submitted for this session a little late, but it may be possible to get them reviewed in time for the for the final submission date of August 4, 2006.

2. Forum, Dallas January 2007: Elevator Use During Fire

John Klote – Program Moderator.

3. Seminar, Dallas January 2007: Effects of Sprinklers on Atrium Smoke Control

Ray Sinclair – Program Moderator

Status: Ray Sinclair has not given us the names of any proposed speakers, and he is not attending this meeting. Bill Webb will contact him to find out about the status of this program.

4. Transaction Session, Long Beach June 2007: RP1300 – Smoke Control and Make-up Air

Velocity, Bill Webb – Program Moderator

Status: Research is ongoing, and the titles and names of the speakers will be provided.

5. Seminar, Long Beach June 2007: Smoke Control Analysis – Back to Basics

Jeff Tubbs – Program Moderator

- a. Algebraic Equations – Lougheed
- b. Network Modeling – Klote
- c. Zone Modeling – Webb

Note: The last few Back to Basics seminars TC 5.6 proposed did not get listed as Back to Basics. Jeff Tubbs needs to contact the Program Committee to see how we get this one accepted as Back to Basics. Further, the speakers all need to make an extra effort to focus on the basics.

5. Seminar, New York January 2008: Fire and Smoke Control Dampers

Bob Van Becelaere – Program Moderator

Status: Bob Van Becelaere indicated that there are a lot of things happening in this area, and the New York meeting will be a good time for presentations on this topic.

7. Transaction Session, New York January 2008: Smoke Control and Evacuation

Bill Webb – Program Moderator

- a. Overview of Emergency Evacuation – Klote
- b. Human Behavior in Emergencies – Proulx
- c. Evacuation Plans for Tall Buildings – Tubbs
- d. What was learned from WTC Study – Bukowski

8. Seminar, Salt Lake City June 2008: Design and Acceptance Criteria

TO BE DETERMINED – Program Moderator

Status: Possible program.

9. Transaction Session, Salt Lake City June 2008: CFD Modeling Techniques for Smoke Control

John Klote – Program Moderator

Status: Need to line speakers.

c) Membership

John Clark invited meeting guests to become corresponding members and he noted that the committee is looking for a mix of members. He asked those interested to give him a business card and indicate their interest and noted that the TC is looking for a minimum of a three year commitment for members. John also noted that consulting engineers directly involved with current technologies will be given priority.

d) Handbook

John Clark noted that ASHRAE voted to keep the printed version of the handbook and that the CD+ version will include hyperlinks and provide more interactive content.

e) Standards

Bill Webb, the Guideline 5 sub-committee chair, noted that the standing timeslot for Guideline 5 will change to 3:15 to 4:15 on Mondays and discussed that this document will provide testing and commissioning guidance for smoke management systems. Bill noted those interested in participating in Guideline 5 should contact him and committee participation will not be limited to members.

f) Specification Documents for Smoke Control Exhaust Fans

AMCA SPC 149 the certified rating program for smoke control fans is ready for final voting.

g) Elevator Use

John Klote noted that there is new interest in the use of elevators for evacuation. ASME has a committee developing recommendation for the possible use of elevators for evacuation. Large pressure differences can cause elevator doors to jamb. The committee decided to wait until after the forum in Dallas to decide about adding a sub-committee.

h) Website

The web site address is <http://tc56.ashraetcs.org/>.

6) Intra-Society Liaison Reports:

a) TC 1.4

Larry Felker indicated that there overlap issues between TC 1.4 and TC5.6 are Green Building Design and Homeland Security, and that there is nothing new to report.

b) TC5.2 – Duct Design

Bob Van Becelaere indicated that there is nothing to report relative to TC5.6.

c) TC5.9 – Enclosed Vehicular Facilities

Paul Miclea reported that TC 5.9 is meeting tomorrow afternoon and he noted that the co-sponsoring worked well. Paul encouraged the committee to continue this practice.

d) TC5.10 – Kitchen Ventilation

John Clark emphasized the need for collaboration between kitchen hood design and smoke control systems.

e) TC7.9 – Building Commissioning

Guideline 0 is complete and the final version of Guideline 1 will be available before the Dallas meeting. TC 7.9 committee voted to disapprove.

f) TC9.1 – Large Building Air Conditioning Systems

Nothing to report.

g) TC9.8 – Large Building Air Conditioning Applications

Liaison needed

h) TC9.10 – Laboratory Systems

Liaison needed.

i) TC9.12 – Tall Buildings

TC 9.12 is looking for new members.

7) Inter-Society Liaison Reports:

a) CIBSE (Chartered Institute of Building Services Engineers)

Liaison needed.

b) NFPA 80 – Standard for Fire Doors and Fire Windows

Nothing to report.

c) NFPA 90A – *Installation of Air Conditioning and Ventilating Systems*

Bob Van Becelaere reported that the committee will be reconstituted and meetings will begin in October.

d) NFPA 92A – *Standard for Smoke Control Systems Utilizing Barriers and Pressure Differences* and NFPA 92B – *Standard for Smoke Management Systems in Malls, Atria, and Large Areas*

Paul Turnbull reported that both of these documents have been converted to Standards. 92B has been incorporated in the 2006 International Building Code. The committees decided to wait one more cycle before deciding to merge the documents.

e) UL (Underwriters Laboratories)

Nothing to report

f) AMCA (Air Movement and Control Association)

Other standards issues included that AMCA is working with UL to establish testing requirements for actuators used with smoke dampers and combination fire / smoke dampers. The revised testing requirements will include long-term holding test and follow-up testing requirements for the actuators.

The AMCA Damper Engineering Committee (DEC) will test a 72 inch by 96 inch damper with four independently operated pneumatic actuators (25 psi) at 2,400 fpm at 4.5 inch static pressure that are weight compensated for heated air flow. The units should work in unision for the first test, and then the operating times will be varied to see if they still open and close.

A task group is developing an alternate proposal for testing proposal for approval by the DEC at the next meeting. A conference call for multi-section alternate proposal task group is scheduled for June 29th. Upon its approval, the alternate testing proposal will be presented to UL.

g) SFPE

Nothing to report.

8) Old Business

Nothing to report.

9) New Business

It was decided to add NFPA 130, NFPA 502 and the ICC to the agenda for future meetings. It was reported that the NFPA 130 2006 edition will be available in the next several months. NFPA 502 will be undergoing revisions soon. It was reported that the ICC has two new committees, Terrorists Resistant Buildings and the Code Technology Committee.

10) Adjournment

The meeting was adjourned at 5:30 pm.