

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

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TC/TG/TRG MINUTES COVER SHEET

TC/TG/TRG No. TC5.6

DATE: April 10, 2006

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

DATE OF MEETING: January 23, 2006

LOCATION: Chicago, IL

VOTING MEMBERS PRESENT	YEAR APPT'D	VOTING MEMBERS ABSENT	YEAR APPT'D	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
John Clark	2004	Sudhir Agrawal	2002	Mark Belke, Guest
Dick Graves	2005	Stephen D. Carey	2003	James Buckley, CM
John Klote	2002	David Elovitz	2002	Dane Carey, CM
Roger Lichtenwald	2004			Mark Colino, Guest
Paul Miclea	2003			Darryl DeAngelis, Guest
Ray Sinclair	2002			Robert Dittrich, CM
Jeffrey Tubbs	2005			Larry Felker, CM
Paul Turnbull	2005			Marty Gissel, CM
Bob Van Becelaere	2003			Colleen Guest, CM
Robert Wasilewski	2005			George Hadjisophocleous, CM
William Webb	2002			David John, Guest
				Kai Kang, CM
				Ahmed Kashef, CM
				Jerry Kettler, Guest
				Gary Loughheed, CM
				Peter McDonnel, Guest
				Valentina Nedelcu, Guest
				Ian Ong, Guest
				Tim Orris, CM
				Greg Sanchez, CM
				Glen Schuyler, Guest
				Ehab Zalok, Guest

**DISTRIBUTION**

<b><i>All Members of TC/TG/TRG plus the following:</i></b>	
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  
Chicago, IL  
January 23, 2006**

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**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 voting procedures. Nine of fourteen members were present at the beginning of the meeting. Two members joined the meeting while in progress.

**3) Minutes of Previous Meeting:**

The minutes of the previous meeting (Denver - June 2005) were distributed and approved .

**4) Chair's Remarks**

Paul Turnbull reminded that TC membership changes occur after the June meeting in Quebec City, and reviewed the following from the chair meeting:

- All members, corresponding members and guests are encouraged to review and update their biographical information.
- ASHRAE received an invitation to submit proposals for session topics at Greenbuild 2006 in Denver.
- ASHRAE is forming a task group to develop a protocol for evaluating the measurement and reporting of the performance of new and existing buildings (except low-rise residential).

Copies of ASHRAE's privacy policy were distributed and reviewed.

**5) Subcommittee Reports:**

**a) Research**

Bill Webb reported on the progress of RP1247 and RP1300 and WS1328

- RP1247 (Balcony Spill Plumes). NRC has completed the work. The draft final report has been submitted to ASHRAE and is undergoing review by the PMS. Because of the delay in completing the final report, the three papers intended to be submitted for Quebec City

will be submitted for the Dallas meeting.

- RP1300 (Maximum Velocity of Make-Up Air in Atrium Smoke Control Applications). The Project is underway. The literature search and simulations of a 10x10x10 meter atrium have been completed, varying make-up air velocities and fire sizes. A methodology has been developed to evaluate system performance under different make-up air velocities. To date, the contractor has performed 50% of the simulations for the 20m high atrium.
- WS1328 (Develop Algorithms for Smoke Movement Modeling in Large, Multi-Compartment Buildings). 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. The goal of 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.

The Project was originally bid in May, 2005. Four bids were received. The Proposal Evaluation Subcommittee (consisting of Paul Turnbull, John Klote, Ray Sinclair and Bill Webb) recommended the bids be rejected and the project be rebid. The RFP was revised to clarify the requirements and the Project was rebid. The PES (same as earlier) has completed the evaluation of the bids.

A closed session was convened to review the PES recommendations. The committee voted to accept the PES recommendations (record of vote: 8-0-0).

- Stairwells and Open Doors: From TRP-1203, we learned that stairwell pressurization air significantly dilutes combustion products in the stairway, even with the stair door on the fire floor open. Because of the limits of computer models we have now, 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 payoff for this project is 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.

The RTAR was reviewed and revised. The committee voted to send the RTAR to the RAC (record of vote: 9-0-0).

Bill discussed the following possible future research topics.

- 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 Loughheed 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.
- Plugholing. There are competing thoughts on how to design to prevent plugholing. It was agreed that the committee should review existing data from previous plugholing studies to

determine whether data is sufficient to support either of the competing methods (92B-2005, CIBSE/92B-2000), or whether additional research is required.

## b) Program

Program subcommittee Chair John Klote reported that the Society Program Committee is reconfiguring the time allowed for each symposia, seminar and technical session. This reconfiguration would allow for greater time utilization for TCs and attendees.

Symposia and Technical Sessions are being renamed as Transaction sessions.

Time slots for Seminars and Transaction sessions are being reduced to 1-1/2 hours from 2 hours. The number of speakers per session will be 2 minimum and 3 maximum. To accommodate sessions with additional speakers, the Program Committee will schedule back to back sessions as part 1, part 2 sessions. Each session will need to be submitted online.

Also, dedicated 1 hour slots for Forums have been created. Depending on program demand and space availability, some sessions may be scheduled Sunday afternoon from 3:30-5:00.

John discussed future program plans as follows. Note that the names listed below represent possible speakers or authors.

1. **Seminar, Quebec City June 2006: Smoke Control and the Codes**

Program Moderator – George Hadjisophocleous

NFPA 92A – Paul Turnbull

NFPA 92B – John Klote

IBC – Jeff Tubbs

Canadian Code – Ahmed Kasheb

NFPA Code – Bill Webb

Status: Package needs to be submitted by February 10, 2006

2. **Transaction Session, Dallas January 2007: Balcony Spill Plumes**

Program Moderator – Bill Webb

Experiments – Gary Loughheed

CFD Modeling Entrainment and the Spill Edge – George Hadjisophocleous

Zone Modeling & Analytical Modeling – NRC staff

CFD Modeling Overall – McCartney

Status: Bill Webb will coordinate for the Dallas meeting.

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

Program Moderator – Ray Sinclair

Status: Speakers need to be found. See comment on item 6.

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

Program Moderator – Bill Webb

Status: Research underway.

5. **Seminar, Long Beach June 2007: Smoke Control Analysis – Back to Basics**  
Program Moderator – To be determined

Algebraic Equations  
Network Modeling  
Zone Modeling  
CFD Modeling

Status: Need to get speakers

6. **Seminar, New York January 2008: Fire and Smoke Control Dampers**  
Program Moderator – Bob Van Becelaere

Status: Speakers need to be found.

Comment: The chances of TC 5.6 getting 2 seminars approved at the same meeting is extremely low. Either this seminar or item 5 should be scheduled for another meeting.

7. **Transaction Session, New York January 2008: Smoke Control and Evacuation**  
Program Moderator – Bill Webb

Overview of Emergency Evacuation – Klote  
Human Behavior in Emergencies – Proulx  
Evacuation Plans for Tall Buildings – Tubbs  
What was learned from WTC Study – Bukowski

8. **Future Seminar, Acceptance Criteria**  
Program Moderator to be determined

Status: Possible program.

### c) Membership

John Clark invited meeting guests to become corresponding members. He asked those interested to give him a business card and indicate their interest. John also noted that consulting engineers directly involved with current technologies will be given priority.

### d) Handbook

John Clark noted that ASHRAE members will be given a choice to receive the handbook in published book, CD or CD+ version.

Proposed changes to Chapter 52 were discussed. The TC 5.6 handbook committee recommended the following updates to those changes:

1. Revise page 52.12 as follows: “.. elevator smoke control systems for ~~evacuating handicapped individuals~~ evacuation of people incapable of self rescue.”
2. Add new reference on page 52.18, referring to ISO 13571 (Standard on Tenability)
3. Delete current text and add new paragraph on page 52.16 for section “**Atrium Smoke**

**Filling by an Unsteady Fire”** to refer users to CFD and zone models for unsteady filling.

4. Update equations on Page 52.16 **“Minimum Smoke Layer Depth”** to agree with 2005 NFPA 92B.

The committee voted to accept the recommendation to forward handbook Chapter 52 changes with updates to the ASHRAE Handbook Committee (record of vote 11-0-0).

**e) Standards**

It was reported that the committee is still looking for volunteers to assist with Guideline 5.

**f) Specification Documents for Smoke Control Exhaust Fans**

Bob Van Becelaere reported AMCA 149 will be available soon.

**g) Website**

It was noted that Kia Kang will serve as the new WEB Site coordinator and that the WEB site has moved to ASHRAE’s server. It was agreed that we will post errata for the Principles of Smoke Management test on the WEB site.

**6) Intra-Society Liaison Reports:**

**a) TC 1.4**

Larry Felker reported that 1.4 has nothing to report specifically relevant to TC 5.6.

**b) TC5.2 – Duct Design**

Bob Van Becelaere indicated that there is nothing to report.

**c) TC5.9 – Enclosed Vehicular Facilities**

Paul Miclea reported that TC 5.9 will resubmit two programs for the next meeting.

**d) TC5.10 – Kitchen Ventilation**

John Clark reported that high velocity differs can affect adjacent smoke detectors. John also reported that fire protection systems for kitchens are typically based on the assumption that exhaust systems are in operations; night mode operations may adversely affect system effectiveness.

**e) TC7.9 – Building Commissioning**

Guideline 0 is complete and the final version of Guideline 1 will be available shortly. Guidelines will be developed for commissioning existing buildings, for training and operations of maintenance personnel, and for commissioning in high performance buildings.

**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.

**TC9.12 – Tall Buildings**

TC 9.12 had an open session discussing HVAC systems in four of the worlds tallest buildings (this session was scheduled at the same time as the TC 5.6 meeting).

**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**

Bob Van Becelaere reported that the NFPA 80committee petitioned NFPA t include requirements for installation and maintenance of fire dampers.

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

Bob Van Becelaere reported that the committee met in December to resolve the manycomments they received. One of the hot issues is the frequency of cycle or maintenance of fire dampers. It appears that the recommendations are for hospitals to be every six-years and for other applications every 4-years.

**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.

**e) UL (Underwriters Laboratories)**

Nothing to report

**f) AMCA (Air Movement and Control Association)**

Bob Van Becelaere reported AMCA 149 will be available soon.

**g) SFPE**

Nothing to report.

**8) Old Business**

Nothing to report.

**9) New Business**

Nothing to report.

**10) Adjournment**

The meeting was adjourned at 6:00 pm.