



January 2022

THE LONG ISLAND SOUNDER



ASHRAE Long Island Chapter, Region I...Founded in 1957

www.ashraeli.com

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

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President's Message

Hello everyone and welcome to ASHRAE LI 2022!

This month we have decided to host a virtual meeting, hopefully next month we can be back in person at the Westbury Manor. Please talk to Murat if you don't know how to sign up for the meeting.

ASHRAE is kicking off the year with the AHR Expo Jan 29-Feb 2, 2022 in Las Vegas! A few people from our chapter are attending – have fun!

We are in the middle of our Membership Battle! See details below in our membership promotion segment and help the chapter by promoting membership in your company. Membership has been struggling the last few years in ASHRAE as a whole – although our chapter has been doing quite well despite the last few years difficulties. Please keep your membership up to date and remind your peers to do the same. Our biggest challenge as the BOG is minimizing the amount of lapsed members.



We will be finalizing a few YEA and membership events for the spring, and we will update as soon as we have dates nailed down.

Please keep an eye on the website, www.ashraeli.com, for the most up to date information on monthly presentations, upcoming events, etc.

If anyone is interested in joining a committee, please reach out to anyone on the board of governors. We are always looking for volunteers!

Regards,

Matthew Vitrano
President - Long Island Chapter

CHAPTER MONTHLY MEETING

DATE/ TIME:	Tuesday, January 11, 2022 @ 6PM
LOCATION:	Virtual Meeting https://teams.microsoft.com/join/19%3ameet-ing_ZjI5MzRmYTYtMDEyZi00ZjdiLWJiNjltOGQ5ZjA0ZmE2MG5%40thread.v2/0?context=%7b%22Tid%22%3a%22a187de30-3680-4ccc-96b4-d05cbaa2d475%22%2c%22Oid%22%3a%224d33667b-2638-4c75-8e1e-073bd7b8e9e6%22%7d
FEES:	
Attendees:	\$20 per person

Check the ASHRAE Website for Society news and to join/renew membership!
<http://www.ashraeli.com>

Long Island Chapter Officers & Committees

ASHRAE 2020/2021 OFFICERS

POSITION	NAME	PHONE	EMAIL
President	Matthew Vitrano	516.319.9325	c006@ashrae.net
President-Elect	Murat Bayramoglu	631.312.8818	c006pe@ashrae.net
Vice President	Michael Nigro	212.643.9055	c006vp@ashrae.net
Treasurer	Elizabeth Jedrlnic	516.490.1621	c006tr@ashrae.net
Secretary	Matthew Catan	407.489.6684	c006sec@ashrae.net
Board of Governors	Michael Razzano	516.805.3084	c006bog1@ashrae.net
Board of Governors	Zhigang Xu		c006bog2@ashrae.net
Board of Governors	Rich Smith		c006bog3@ashrae.net
Board of Governors	Michael S. Gerazounis	212.643.9055	c006bog4@ashrae.net
Board of Governors	James Hanna	718.269.3768	c006bog5@ashrae.net

ASHRAE 2020/2021 COMMITTEES

COMMITTEE	NAME	PHONE	EMAIL
Programs & Special Events	Murat Bayramoglu	631.312.8818	c006pe@ashrae.net
Membership (MP)	Michael Razzano	516.805.3084	c006mep@ashrae.net
Refrigeration	Andrew Dubel		c006ref@ashrae.net
Chapter Technology Transfer (CTTC)	Murat Bayramoglu	631.312.8818	c006cttc@ashrae.net
Grassroots Government	James Hanna	718.269.3768	c006ggac@ashrae.net
Newsletter Editor	Liset Cordero	212.643.9055	c006ne@ashrae.net
Research Promotion (RP)	Michael Nigro	212.643.9055	c006rp@ashrae.net
Historian	Elizabeth Jedrlnic	516.490.1621	c006his@ashrae.net
Student Activities (SA)	Matthew Catan	407.489.6684	c006sa@ashrae.net
Young Engineers in ASHRAE (YEA)	Michael S. Gerazounis	212.643.9055	c006yea@ashrae.net
Webmaster	Frank Paradiso	631.632.2792	c006web@ashrae.net
Nominating	Michael Gerazounis, PE, LEED AP	212.643.9055	nominating@ashraeli.org
Reception & Attendance	Zhigang Xu / Matt Catan / Michael S. Gerazounis		reception@ashraeli.org
PR & Engineering Joint	Andrew Manos, LEED AP	631.632.2792	pr@ashraeli.org
Golf Outing	Peter Gerazounis, PE LEED AP	212.643.9055	golf@ashraeli.org
Awards	Brian Simkins	203.261.8100	c006ha@ashrae.net
ASHRAE LI, P.O. Box 79, Commack, NY 11725			

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Chapter Monthly Meeting - Program for 2021/2022

September 14, 2021 * At Westbury Manor ✓ Dinner Presentation – Fan Fundamentals Presenter: Andy Siegelson Refrigeration Night **1 PDH**	March 8, 2022 * At Westbury Manor Dinner Presentation— TBD Presenter: TBD Student Activities Night YEA Night **1 PDH**
October 12, 2021 * At Westbury Manor ✓ Dinner Presentation — PPRCT Pipe and Fitting Systems for HVAC Water Distribution and Compressed Air Distribution Presenter: Jordan Stern **1 PDH**	April 12, 2022 Dinner Presentation— TBD Presenter: TBD **1 PDH**
November 9, 2021 * At Westbury Manor ✓ Dinner Presentation— Critical Environment Air Distribution Applications Presenter: Larry Scholl, CEM, LEED AP BD+C Membership Promotion Student Activities Night and YEA Night Resource Promotion Night **1 PDH**	May 2, 2022 * Cherry Valley Club, Garden City, NY ANNUAL GOLF OUTING
December 14, 2021 * At Westbury Manor ✓ Dinner Presentation— Eliminating the High Cost of Over Pumping Presenter: Rick Smith **1 PDH**	May 10, 2022 Annual Field Trip
January 11, 2022 * At Westbury Manor Dinner Presentation— Duct System Acoustics Presenter: Patrick J. Brooks, MBA, P.E. ASHRAE DISTINGUISHED LECTURER **1 PDH**	June 14, 2022 * At Westbury Manor Free Buffet Dinner for Members PAST PRESIDENTS NIGHT & OFFICER INSTALLATION STUDENT SCHOLARSHIPS TO BE AWARDED ASHRAE History Quiz and prize Give-A-Ways
January 29 - February 2, 2022 ASHRAE Winter Conference	June 2022 - TBD (4pm-8pm) * Dixie II @ Captree State Park Boat Basin, NY ANNUAL FISHING TRIP
February 8, 2022 * At Westbury Manor Dinner Presentation— Optimizing IAQ and Energy Efficiency with Air Scrubbing and Filtration Presenters: Doug Engel, Joe Master, Anurag Goel **1 PDH** Membership Promotion Night Resource Promotion Night	August 2022 CHAPTERS' REGIONAL CONFERENCE (CRC) REGION I GRANIT STATE
February 20-26, 2022 NATIONAL ENGINEERS WEEK	

Meeting Program



Dinner Presentation

Duct System Acoustics

Presented by

Patrick J. Brooks, MBA, P.E.
Senior Project Manager
SMACNA

ASHRAE DISTINGUISHED LECTURER

**Attendees
 Will Earn
 1 PDH!**

DATE:	TUESDAY, JANUARY 11, 2022 (VIRTUAL PRESENTATION)		
Time:	6:00 PM - Cocktails and Hors D'oeuvres 7:00 PM - Dinner Presentations 8:45 PM - Conclusion	Fee:	\$ 20.00 per person
Location:	WESTBURY MANOR (516) 333-7117 1100 Jericho Tpke., Westbury, NY 11590 Directions are posted at @ www.ashraeli.org		
Presentation:	This month's presentation covers the fundamentals of calculating duct system acoustics. The designer will learn what noise is, how to mathematically combine noise levels and how to control noise in duct systems. Frequency and amplitude and how people perceive noise are important concepts that are also covered. The designer will also learn the difference between sound power and sound pressure and how to convert sound power levels to sound pressure. The range of hearing and the problems with low frequency noise vs high frequency noise is discussed. Natural attenuation of duct elements and how to determine it will be reviewed. How to solve acoustic problems using distance, silencers and duct insertion losses are examined as well as how noise criteria (NC) levels are used. All attendees will receive 1 PDH.		
About our Speaker:	Patrick "Pat" Brooks is a Professional Engineer with over 40 years of experience focusing on duct and acoustics design, duct construction and duct fabrication as well as being a general manager and a director of manufacturing. Pat received his undergraduate degree in Mechanical Engineering in 1978 from The Ohio State University and his Master of Science Degree in Mechanical Engineering from the same University in 1986. He also received a Master of Business Administration from The Ohio State University in 1990. He has served as the Manager of Research and Development, General Manager and Director of Manufacturing while at United McGill Corporation. He has also been a General Manager for Eastern Sheet Metal, Inc. and is currently a Senior Project Manager with the Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA). Pat has published several papers on duct design, duct leakage, acoustics and COVID mitigation.		

CHAPTER MAY NOT ACT FOR SOCIETY

An International Organization

**The Long Island Chapter is looking for presenters for the remainder of the year.
 Please contact us if you are interested in presenting to our membership.**

Long Island Chapter - Past Presidents

1958	H. Campbell, Jr. PE	1990	Robert Rabell
1959	Clyde Alston, PE	1991	Gerald Berman
1960	Sidney Walzer, PE	1992	Donald Stahl
1961	Sidney Gayle	1993	Ronald Kilcarr
1962	William Kane	1994	Jerald Griliches
1963	Louis Bloom	1995	Walter Stark
1964	Milton Maxwell	1996	Joe Marino
1965	Will Reichenback	1997	Norm Maxwell, PE
1966	Joseph Minton, PE	1998	Alan Goerke, PE
1967	Irwin Miller	1999	Frank Morgigno
1968	Walter Gilroy	2000	Michael Gerazounis, PE, LEED AP
1969	Charles Henry	2001	Ray Schmitt
1970	William Wright	2002	Steven M. Stein, PE
1971	Louis Lenz	2003	Andrew Braum, PE
1972	Ronald Levine	2004	Claudio Darras, P.E.
1973	Henry Schulman	2005	Craig D. Marshall, P.E.
1974	Myron Goldberg	2006	John Nally
1975	John N. Haarhaus	2007	Peter Gerazounis, PE, LEED AP
1976	Richard K. Ennis	2008	Steven Friedman, PE, HFDP, LEED AP
1977	Kenneth A. Graff	2009	Steven Giammona, P.E., LEED AP
1978	Evans Lizardos, PE, LEED AP	2010	Nancy Román
1979	Albert Edelstein	2011	Carolyn Arote
1980	Ralph Butler	2012	Brian Simkins, LEED AP
1981	Robert Rose, PE	2013	Andrew Manos, LEED AP BD+C
1982	Timothy Murphy, PE	2014	Richard L. Rosner, P.E.
1983	Leon Taub, PE	2015	Thomas J. Fields, P.E., LEED AP
1984	Raymond Combs	2016	Donald Kane, P.E.
1985	Edward W. Hoffmann	2017	Andrew Dubel, P.E., LEED AP
1986	Jerome T. Norris, PE	2018	Richard Halley
1987	Abe Rubenstein, PE	2019	Frank Paradiso
1988	Michael O'Rourke	2020	James Hanna
1989	Mel Deimel		

PAOE POINTS FOR 2021/2022

Chapter Members	Chapter Operations	CTTC	Communi-cations	GGAC	History	Member-ship	Research Promotion	Student Activities	YEA	Chapter PAOE Totals
282	485	700	0	0	120	475	400	125	1,375	3,680

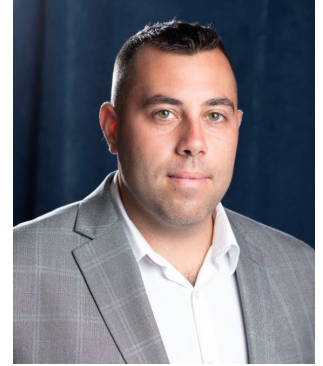
Research Promotion

“No research without action, no action without research”

– Kurt Lewin

I would like to thank the companies who have participated in the annual Product Directory of Manufacturers and their Representatives. The product Directory has been prepared as a service to all its members and as a service to the local HVAC industry. It will be made available to all ASHRAE and non-ASHRAE members at no-cost and can be obtained from our monthly meetings or directly from our website.

This year's overall research promotion goal is \$2,593,341 with many research projects on board. Our chapter is expected to raise \$20,400 towards the overall goal. I am hoping that I can count on the continued support of all our past contributors who have generously supported us over the years. I also look forward to gaining the support of new contributors this coming year. Last year we were successful in beating our goal by over \$8,000 and am hopeful that this year we can continuously raise the bar.



Thank you to our contributors:

Individual

John D. Nally
 Michael Gerazounis
 Matthew K. Bendix
 Elizabeth Jedrlinic
 Andrew E. Manos
 Matthew Vitrano
 Michael Nigro
 Murat Bayramoglu
 Michael Steven Gerazounis
 Richard W. Smith
 Michael H. Razzano
 James Hanna
 Frank Paradiso
 Matthew Catan
 Donald Kane

Companies

H2M Architects + Engineers
 Robert Half

CONTRIBUTIONS CAN BE MADE IN THE FOLLOWING WAYS:

1) You can mail your checks, made out to ASHRAE Research Promotion:

Michael Nigro
 ASHRAE Research Promotion Chair
 PO BOX 79
 Commack, NY 11725

2) You can bring your check to any of the meetings and hand to myself or Elizabeth.

3) You can contribute via PayPal from the ASHRAE LONG ISLAND web site, just click on the donate button.

4) You can contribute directly on-line. www.ashrae.org

**** Please make sure you accredit your contribution to the LONG ISLAND CHAPTER 006 ****

Thank you again for all of your support!

Michael Nigro

Research Promotion Chair

Membership Promotion

In the words of Kobe Bryant, "It's the magic within each of us that gives us the potential to inspire the world." To begin 2022 membership new year's newsletter, I'd like to wish everyone best wishes for a happy & healthy 2022, as well as continued success in the coming year! Regarding success, I hope our membership continues to grow as an increasing number of HVAC professionals recognize the benefits and value that ASHRAE membership provides. Since we kicked off in September, our Long Island Chapter of ASHRAE hasn't had such great success in growth with a higher-than-normal amount of delinquent members & losing a few members due to cancelations.



Although our membership numbers could be better, it remains our greatest strength and we look forward to welcoming even more new members in the coming year. Through the year we will continue to offer great programs, learning opportunities and leadership that will help you everyone including our newest members. With the current ASHRAE board and set schedule, we're ensured to have another success year. These opportunities will provide vital stepping stones to success by way of friendships, education & networking.

With the multiple activities set during this year, a potential idea for everyone is to make ASHRAE one of your new year's resolutions. Please visit our website at www.ashraeli.org for more information about upcoming events. I would like to informally welcome our new members this month:

1. Michael Ganz
2. Nicholas Cianciotti
3. Gregory Cross
4. Kieran O'Sullivan
5. Ronaldo A Bazan

Looking forward to another great month and thank you in advance for your support, time & guidance.

Michael H. Razzano
Membership Promotion Chair

Richard Smith
Membership Promotion Co-Chair

History

See below for an interview with Past Chapter President, Ronald Kilcarr:

Ron Kilcarr was born in Good Samaritan Hospital right here on Long Island. In his early years, he attended Deer Park High School and continued his higher education across NY. He attended the State University of New York at Farmingdale, Rochester Institute of Technology, New York Institute of Technology and the University of the State of New York. He is a PE and is currently a Strategic Business Development Leader at the Trane Company. This month I had the opportunity to interview him in reference to his past experiences in the industry and in ASHRAE. He is a past president of the LI chapter and remains a committed member of the LI chapter.



Name: Ronald Kilcarr

Degrees: A.A.S. in Air Conditioning Engineering Technology, B.S. in Energy Engineering Technology, M.S. in Energy Management and my Professional Engineering License

1. What attracted you to engineering and the HVAC industry?

As far as engineering goes, in High School I seemed to be somewhat successful in math and science which are natural derivatives of Engineering. What attracted me to the HVAC industry was what appeared to be the inherent long term society requirements for HVAC and the ability to sustain a career.

2. What was your first job in the HVAC industry and where did it lead?

My first job in this industry was in 1982 for a design build HVAC Contractor named E.W. Hoffmann, Inc. where I started out assisting the project engineers with drawing revisions (with a T-square and pencils – remember those). I thought this was great, I got to re-size ducts and pipes, drawing things that were real and doing load calculations, all skills I just learned in college. Oh and don't let me forget to mention the hours in the dark room with the undeveloped yellow paper and tracings making blueprints (ok, just lost more than half the readers). Then I started working with the project engineers doing project estimating.

Now this is where I get hooked, the project engineers started to bring me to the project sites. Now I saw the job I did the HVAC load calculations for, I saw the equipment we selected for the project, I saw the pipes and ducts that I revised on the drawings. I sat in on the project meetings, saw that the world was not just black and white and that while engineering principals could and should not be compromised, with logical reasoning, solutions are usually obtainable.

As time went by, I eventually started handling my own projects from cradle to grave and provided a strong foundation upon which I have built my career on.

3. Describe the industry at that time.

Due to the energy crisis, while HVAC was a necessity in all buildings at that time, there were demands to be more precise in the designs, give thoughtful consideration to safety factors, bigger was no longer better or acceptable. Building envelopes were changing, Energy Conservation was prevalent. Time of day scheduling, duty cycling and demand limiting of the HVAC equipment were all being incorporated into the new HVAC designs.

History

4. How and when did you get started in ASHRAE?

I became a student member of ASHRAE while I was at college and attended meetings whenever I could. Once I was done with College and working at E.W. Hoffmann, all the project engineers were members of ASHRAE and most were involved in the board, committees etc. and one day I was asked by one of the project engineers if I had any interest in joining the board and one of the committees. My answer was simple and direct, yes, but only if I could be on the reception committee, I wanted to sit at the door, welcome the members as they arrived, extend my hand and tell them that I was Ron Kilcarr and that I was glad to meet them. I had felt that if they knew who I was, If I ever needed help, I stood a better chance of them taking my call and trying to help or offer advise. I think today they call it networking.

5. What was your ASHRAE chapter, regional and Society experience?

While I have been a student member of both the Long Island and the Rochester chapters, I have always called the Long Island chapter my home. I ascended through the officer chairs of the chapter and at 31 became the youngest Long Island chapter president in 1993. While president, our chapter worked extremely hard and were awarded with many Chapter awards at the 1994's Chapters Regional Conference (CRC), including the chapter Presidential Award of Excellence.

6. What were the major issues facing ASHRAE during your presidency?

The biggest challenge was obtaining new members, retaining existing members and enticing members to join the different committees. While money was an underlying issue it was a year in and year out issue.

7. What was your presidential theme?

Good Programs and Team work. If we had good programs of interest, members would want to come to the meetings. If the work needed to be done was accomplished by many in lieu of only a few, we would get much more involvement and more satisfaction out of what we were trying to accomplish and bring a sense of pride to the chapter.

8. What do you consider to be the major accomplishments during your term?

Leading the long Island chapter to obtaining the Presidential Award of Excellence, which involved meeting and/or exceeding all the Society (as well as own) goals such as increased membership, Research funding donations, program quality, student involvement, member participation, chapter publicity, history retention, etc.

9. Did any humorous events take place during your term?

Oh yes there were! And what happens at the CRC stays at the CRC.

History

10. Are there any things that you wish you could have done differently?

Yes, I wish I didn't put the idea of having a golf outing to a vote to a board that generally had no interest in golf.

11. What events have changed the industry since your presidency?

That's easy, innovation and DDC controls.

12. What has ASHRAE meant to you personally?

Throughout my career it has been a major source of invaluable information, whether it is the information available or the knowledgeable people whom I have been lucky enough to meet and associate with.

13. What advice would you give to a young person entering the HVAC field?

Join ASHRAE, attend the local meetings, join a committee, get involved and by all means stick your hand out and introduce yourself.

14. What other interests and/or hobbies do you have?

I really enjoy sports and sporting events. My two sons are heavily involved in competitive baseball and a lot of our time now is spent traveling to different Baseball events, tournaments and showcases throughout the eastern states.

I want to thank Ron for taking the time to answer my questions and give us all some insight into ASHRAE and the industry as a whole.

Elizabeth Jedrlinic
History Chair

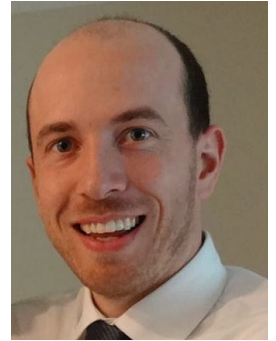
Michael Razzano
History Co-Chair

Grassroots Government Activities Committee (GGAC)

The New York City Council has voted to ban the use of natural gas in new buildings, following in the footsteps of dozens of smaller U.S. cities. The law would apply to new buildings under seven stories high at the end of 2023 and those over seven stories in 2027. There are exceptions for new buildings used for certain activities, including manufacturing, hospitals, commercial kitchens and laundromats.

For more information please follow the below link:

<https://www.reuters.com/markets/us/new-york-city-set-ban-natural-gas-new-buildings-2021-12-15/>



James Hanna

Membership Promotion Chair

Rich Smith

Membership Promotion Co-Chair



CTTC

CHILLED BEAM

We had an excellent presentation about chilled beam systems at our November meeting last year. The following excerpt from ASHRAE's "Science and Technology for the Built Environment" journal, which has access for members on ASHRAE website, discusses the same methods. So many scientists and engineers worldwide issue their findings from their building science studies and experiments. These studies can be an excellent source for engineers trying to solve issues on their projects or find new ways to implement projects.

In the meantime, follow upcoming events on Long Island Sounder Newsletter and on social media link: <https://www.linkedin.com/in/ashraeli/>



We are excited to see all our Chapter members on January 11th, 2022, Tuesday 6:00 PM virtually. The presentation by Patrick J. Brooks, MBA, PE who serves as a senior project manager at SMACNA, is about "Duct System Acoustics." Mr. Brooks have over 40 years of experience focusing on duct and acoustics design, duct construction and duct fabrication as well as being a general manager and a director of manufacturing. Now as a Senior Project Manager at SMACNA he helps write and maintain their duct construction, sound and vibration and duct design manuals, as well as write technical papers.

We would like to thank SMACNA-LI Chapter for joining and organizing this event for us. See you at the virtual meeting.

Research Article

A review of the structure and application of active chilled beams (ACBs) for central air conditioning systems

Yuande Dai, Jiantao Qiu, Wenfeng Tu & Ming Li

Accepted author version posted online: 08 Dec 2021, Published online: 23 Dec 2021

Download citation

<https://doi.org/10.1080/23744731.2021.2014246>

Abstract

Active chilled beams (ACBs), as indoor air terminal units in heating, ventilation, and air conditioning (HVAC) systems, have been of great concern in recent years due to the requirements of energy savings and indoor thermal comfort. This paper reviews the structure and application of ACB, which is helpful in identifying current research scenarios and prospects. The results indicate that the structure of ACBs will be improved based on the entrainment ratio (ER), cooling performance and acoustic behavior as the manufacturing level evolves. The mathematical model of ACBs is constantly being optimized, although there is still room for simplification to fit practical applications. Research on airflow patterns and thermal comfort can be extended to larger spaces (including buildings with large sensible heat ratios) and various climates. Based on the optimization of the ACB mathematical model, modern control theory can be focused on the research on ACB control system. ACB system has a coupling trend with other systems to achieve the comprehensive utilization of energy due to the characteristics of high-temperature cooling. In addition, numerous technical issues remain to be resolved to reduce unnecessary energy consumption. These conclusions also provide a simple reference for research and design in the area where this technology is still in its infancy.

Comprehensive application

In terms of the diversity of the research on thermal comfort, an effective multi-objective optimization model based on the good tradeoff between energy consumption and thermal comfort was built by Wu, Cai, and Chen (2021). The thermal comfort was measured with the PPD model. Compared to experienced operating strategy, the proposed strategy

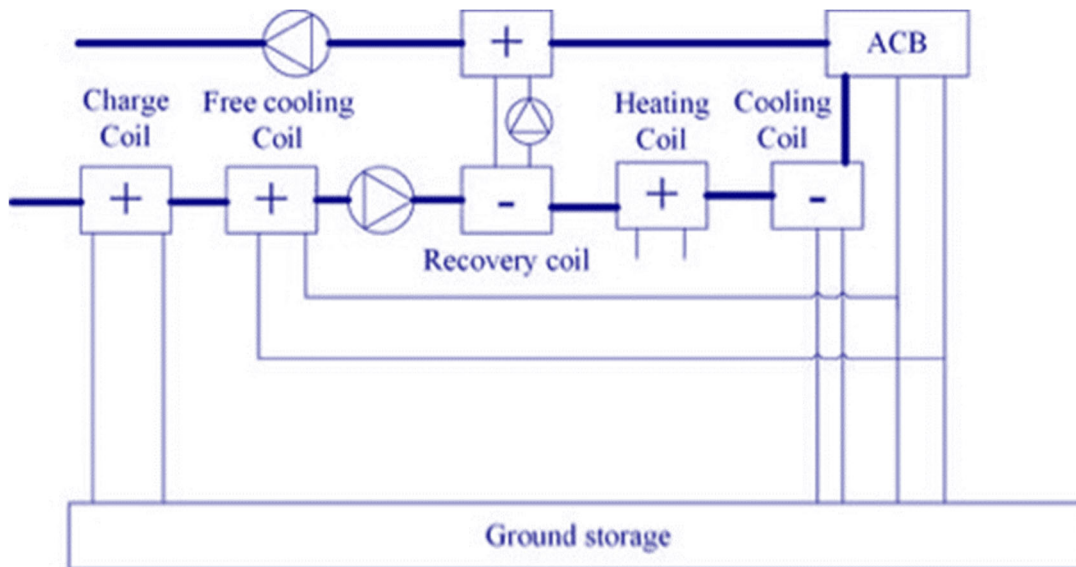
CTTC

demonstrated 12.21% of PPD reduction by increasing the water flow rate and room temperature, and reducing the primary airflow rate.

In the current air conditioning system, if designed for a very small temperature difference between room air temperature and chilled water temperature, small changes of air temperature will have large counteracting influence on the cooling capacity, which brings the possibility of self-regulating to maintain indoor thermal comfort (Kosonen and Penttinen 2017; Filipsson et al. 2020b). The simplicity, robustness, and cost-savings of avoiding thermostats, control valves and actuators are the main drivers for designing completely self-regulating systems (Filipsson et al. 2020b).

In view of the current over cooling problem of self-regulating caused by improper individual room temperature control (Ruponen et al. 2010; Kosonen and Penttinen 2017), Filipsson et al. (2020b) proposed that pure spatial differences (between locations) in cooling load may be taken care of by having different design cooling capacities while pure temporal variations (over time) may be taken care of by controlling the supply chilled water temperature centrally. It was found that controlling the chilled water supply temperature as a function of the temperature of outdoor air or exhaust air was a feasible option, which can effectively improve indoor thermal comfort. On this foundation, Filipsson et al. (2020c) introduces the application of direct ground-coupling (as shown in Figure 10) and self-regulating in the ACB system of an office building. Direct ground-coupled cooling refers to cooling through ground heat exchanger without using water-cooled chiller. The results showed that self-regulating in this research could maintain the indoor air temperature uniform.

Schematic diagram of direct ground-coupling ACB system (Filipsson et al. 2020b).



Based on Filipsson et al. (2020c), the input parameters, such as borehole heat exchanger (BHE) length, internal heat gains and room temperature set-point, are studied with respect to room thermal comfort (Arghand et al. 2021a). The results indicated that the thermal comfort criteria in the room could be met by properly applying the direct ground-coupled cooling even under the most critical conditions of undisturbed ground temperature and internal heat gains. In addition, Arghand et al. (2021b) quantified the influence of terminal units' type (ACB systems and thermally activated building systems) and the corresponding operating strategies on sizing BHEs in direct ground-coupled cooling systems to maintain the indoor thermal comfort (thermally activated building-room thermal comfort within the acceptable range; ACB-room temperature constant).

Murat Bayramoglu
CTTC Chairman

Thomas DiBenedetto
CTTC Co-Chairman

ASHRAE CERTIFICATIONS

Certification



ASHRAE, accredited by ANSI under ISO/IEC 17024 for the High-Performance Building Design Professional (HBDP) program, has certified more than 2,000 Built Environmental Professionals.

Energy Assessment

Energy Modeling

Commissioning

Healthcare
Facility Design

High-Performance
Building Design

Building Operations

ASHRAE certification programs:

- Are developed by industry practitioners who understand the knowledge and experience that are expected for superior building design and system operation
- Assure employers and clients of subject mastery
- Serve as a springboard for continued professional development
- Offer an easy-to-apply process

FOR MORE INFORMATION GO TO - <https://www.ashrae.org/education--certification/certification>

Join ASHRAE on Social Media!



Follow **ASHRAE on Twitter** @ashraenews for up-to-date news, events, and articles about HVAC&R. Search #MyASHRAE on Twitter to see member photos from around the world.

Follow us on [Twitter](#)



Most Popular Tweets

Does It Cost More To Build Green? Benefits include reduced operating costs & construction waste.

Online Thermal Comfort Compliance Tool Included In New ASHRAE User's Manual.

87% of households in the US have #AC, 5% do in India. India's tough choice on air-conditioning and climate.



The November issue of the Journal is tested for binding strength to see how many times a page can be turned before the binding would fail.

Harvard & SUNY Upstate Medical University find that workers are healthier and happier in certified green buildings.

ASHRAE Standard 90.1 has been redefining energy savings since 1975. A new version is available now.

Adapting historical buildings for sustainable reuse.

Get To Know ASHRAE



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