



India Chapter

ASHRAE INDIA CHAPTER

For the
HVAC&R
Industry

Volume 20 Issue 2

Editor : K.K. Mitra, Associate Editor : Dinesh Rawat

BULLETIN

Presidential Message

Dear Fellow Members,

We are now completing another year of ASHRAE India Chapter(AIC) service to the industry. The present AIC BOG completes its one year term on 30th June. The installation of the next AIC BOG would take place on 5th July. The new BOG will be headed by Dr. Varun Jain as President. The theme for the current society year was 'Enrichment of Knowledge Sharing & Engagement of Members'. During the society year our chapter membership grew by 62 new members. We are the second largest Chapter in ASHRAE Region at Large in terms of no of member. Our student membership increased by 72 new members this year. We are also happy to inform you that we have chartered six new student chapters this year. We now have 13 student chapters under ASHRAE India Chapter. This is the highest since formation of our chapter. Our Chapter had submitted five proposal for funding under RAL Chapter Opportunity Fund. Three projects have been accepted for receiving the fund.

— Manipal University Student Branch

project on 'IEQ Benchmarking platform for Institutional campuses' received, funding of \$2200

- BSDU student branch project on 'Development of Solar operated visi-cooler' received, funding of \$1600
- MAIT Student branch project on 'Development of PCM Assisted Half cycle cooling system for Confectionary applications' received, funding \$900

AIC organised regular technical programs during the society year. Conference on 'Emerging Trends in Green and Efficient Rail Transit Systems' organized in association with Delhi Metro Rail Corporation on Dec 20 and 21, 2018 at hotel Le Meridien New Delhi, India was very well attended and appreciated by the industry. The 6th Edition of AIC flagship Annual International Conference "AIC TECH 2019" held 18th Jan., 2019 at Theatre, India Habitat World, New Delhi with theme "Sustainability in Practice – Building Sustainable Hospitals" was also a great success. This year we organised the first edition of RefTec conference on 31st



May, 2019 at Theatre, India Habitat World, New Delhi with theme of the 'Problems associated with Cold Storage Construction' and 'VRF vs CWS'.

I would like to congratulate Mr. Ashish Rakheja on his nomination as ASHRAE Directors-at-Large and also Mr. Richie Mittal for receiving the Distinguished Service Award.

I would also like to thank my BOG team and all members for their support in making it a successful society year.

Indrajit Bhattacharya
President, ASHRAE India Chapter



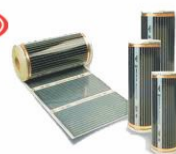
Duct Heaters



Hot Air Blower



BMS Compatible
Duct Control Panel



Heating Film



Heat Tracer



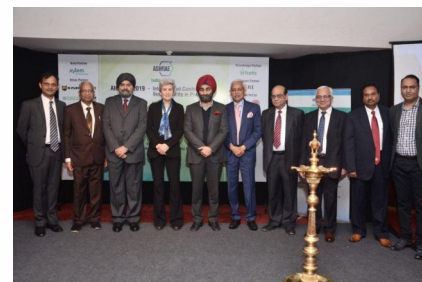
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AIC TECH 2019 Conference

ASHRAE India Chapter organised 6th Edition of its flagship Annual International Conference "AIC TECH 2019" on 18th Jan., 2019 at Theatre, India Habitat World, New Delhi. The Conference theme was titled "Sustainability in Practice – Building Sustainable Hospitals". The conference was a great success with participation from over 200 delegates. The delegates included Industry experts, stakeholders in hospitals, Chief Engineers and Project manager of Hospitals, top decision makers from various user organizations, leading Consulting firms, key persons from the Government and public enterprises, contractors, manufacturers etc. Mr. Shivinder Singh, Founder Fortis Healthcare Ltd. was the Chief Guest for the conference. There were eight technical presentations including presentation on 'Indoor Air Quality in Hospitals' by Dr. Stephanie H. Taylor MD, M Architecture, CEO Taylor Healthcare Consulting, Inc* and ASHRAE DL. The keynote presentation on 'Architecture in sustainable hospital design' was given by Prof.(Dr.) R. Chandrashekar, Chairman IGBC Green Healthcare Rating, Consultant -World Bank, Consultant - IUIH (Indo UK Institute of Health), Former Chief Architect with Ministry of Health & F W ,Govt. of India, Vice President RFHHA (Research foundation of Hospital & Healthcare Administration). The Panel Discussion on 'Building Sustainable Hospitals' was moderated by Mr. Kunal Chaudhari.



Poornima College of Engineering student branch organized an Industrial visit at Kalpataru Power Plant on Jan 5, 2019.

ASHRAE Students Chapter at Amity University, Noida organized Expert Talk at Amity University Campus, Sector-125, Noida on 14th March 2019. Mr. Dinesh Gupta (Executive Director, Bry-Air (Asia) Pvt. Ltd) was the keynote speaker for this session. - delivered an inspiring talk on "Recent Trends of HVAC & Its Technology", "Desiccant based Technologies".



A Two Days National Level Technical Paper and Model Contest, "TECHNOVATION-2019" was held in Poornima College of Engineering student branch from March 15 - 16, 2019.

Poornima College of Engineering Student Branch organised a one-day seminar on Advances in HVAC Industry on Feb 9, 2019. The Lectures were delivered by Mr Dinesh Gupta, Executive Director, Bry-Air (Asia) Pvt. Ltd, Mr KD Singh, Managing Director, Aicon Engineers Pvt Ltd, Dr S.C. Bhaduri, Principal, School of HVAC & Refrigeration Skills, BSDU, Jaipur and Mr Sudhir Mathur, Managing Director, Shreshtha Consultant, Jaipur.



Sharda University Student Branch organised a industrial visit to M/s Air Flow Pvt. Ltd on 9th Feb., 2019.



Industrial visit for students of Amity University was organised on 19th Feb., 2019 at M/s Anilesh Enterprises Pvt. Ltd., Noida.

Poornima College of Engineering student branch and ASHRAE Jaipur Section organized Technical Talk on Myth and Reality about Commercial Kitchen Ventilation by Mr. KD Singh on . April 27, 2019.



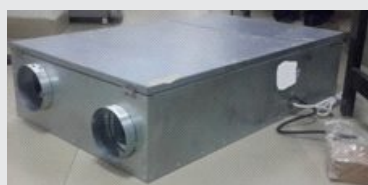
Ref Tec 2019 Conference on 'Problems associated with Cold Storage Construction' and 'VRF vs CWS'

Ref Tec 2019 conference on 'Problems associated with Cold Storage Construction' and 'VRF vs CWS' held on 31st May, 2019.

This was an event comprising a half day on Chilled Water Vs VRF Technology which was mainly covering lecture by Mr. Ashish

Rakheja and a panel discussion coordinated also by Mr. Ashish Rakheja. There was very large participation of more than 120 people with participation from companies consisting of consultants and major equipment suppliers like Hitachi, Johnson Control, Daikin, Samsung, Carrier - Toshiba, Blitz Refrigeration, LG, Lemon

Tree Hotel etc. The second half was on cold storage and the theme lecture was by Mr. Sanjay Gupta from Infracool consultants. Mr. Sanjay Gupta is also the refrigeration chair of AIC. There was also a lecture by Mr. Hitin Suri of Suri Agro Fresh. The event was jointly organised with DCI.



Heat Recovery units



Kitchen Exhaust Fan



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Harit Prem Bharat Mahotsav



Harit Prem Bharat Mahotsav was celebrated by the chapter from January 25 to 29, 2019. The following events were held by the chapter.

- AIC provided 70 solar lanterns to the villagers of Tijara to solve their lighting needs.
- Plantation drive and sustainability lecture done at UPES, Dehradun by AIC on 23rd Jan., 2019
- Painting competition on Sustainability held on 25th Jan., 2019 at Sanghi Public School, Jaipur.
- Painting competition on Sustainable Environment held on 29th Jan., 2019 at Hira Lal Jain Sr. Sec. School, Sadar Bazar (school where Dr. Prem C Jain Studied).
- Debate competition organised amongst students at IIE at DCI office on topic "Green Building and Net Zero building"

Upcoming Event

- ASHRAE India Chapter Annual General Meeting and Installation of new Board of Governors is scheduled to be held Friday 5th July, 2019 at Magnolia Hall, Habitat World at IHC, Lodhi Road New Delhi.
- AIC TECH International Conference with theme 'Sustainability in Practice – Building Sustainable Hotels' on 22nd Nov., 2019 at Gulmohar at India Habitat World, Lodhi Road, New Delhi.
- 3rd ASHRAE Developing Economies Conference proposed in Jaipur in March 2020.

News & Events

ASHRAE RAL Chapter Opportunity Fund

Chapter has submitted five proposals for funding under RAL Chapter Opportunity Fund. Three projects have been accepted for receiving the fund.

- Manipal University Student Branch - IEQ Benchmarking platform for Institutional campuses - \$2200
- BSDU student branch - Development of Solar operated viscooler - \$1600
- MAIT Student branch - Development of PCM Assisted Half cycle cooling system for Confectionary applications - \$900

Inlet vents plays a major role in vehicle thermal comfort

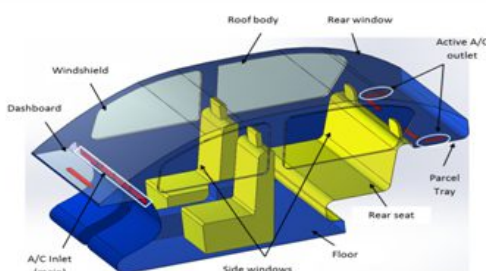
Ashutosh Bhatt, Geetanjali Raghav
UPES, Dehradun

Computational evaluation technique

In the modern era, vehicles have become an integral part of human life and consequently demand for thermal comfort has been increasing for providing ambient environment. Numerous commercial and independent research have been conducted effectively in past decade to ensure proper distribution of air and thermal comfort for human satisfaction. Many independent variables such as solar radiation penetrating through fenestration surfaces, airflow control, PMV and PDV are responsible for delivering comfort to passenger. Subjective evaluation to above conditions is done using Standard 55 by ASHRAE, which a thermal comfort model stated for internal surroundings.

In an ongoing research, effect of inlet vent design on air distribution and thermal comfort has been predicted. A novel design for vent with a simple rectangular geometry and high aspect ratio of 5.4 is studied in comparison to a conventional four channel ventilation system. Motivation for current idea is based on reasoning which are: 1) It is difficult to control heat gain due to solar radiation and removal of which required air-conditioning. An average 14 Kw of load is generated in the process, which is likely to increase with current trend in global warming. 2) Electric vehicles are today appreciated globally and definitely are the future of transportation. An auxiliary load for running AC on main battery pack will lead to decreased efficiency. Moreover, available space under dashboard is likely to increase which provides scope of improvement and reconsideration of current HVAC systems must be done.

Fig [1] shows a geometric model for a commercial sedan car currently running on Indian roads from Honda. To reduce computation time only inner volume inside cabin was considered as computational space.



.Figure 1: Schematic Representation of vehicle inner domain

To examine ventilation, solar heat load is estimated due to diffused and direct radiation relative to sun's direction. "Fair weather Conditions", defined by ASHRAE to calculate direct solar irradiation on earth's surface is used as are considered to be most prominent for evaluations and thus is preferred. As calculated, irradiation is found to be about 724 W/m^2 , but a value of 760 W/m^2 is taken in account to be flexible with results. Average temperature of 51°C on front windshield and 48°C inside cabin is noted, which is further used for computational cooling analysis. Maximum Temperature gain occurs on front and rear seats as can be seen in Fig [2] as one of our finding for driver plane.

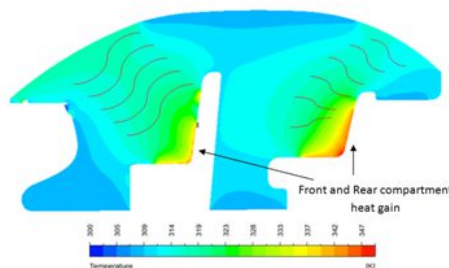
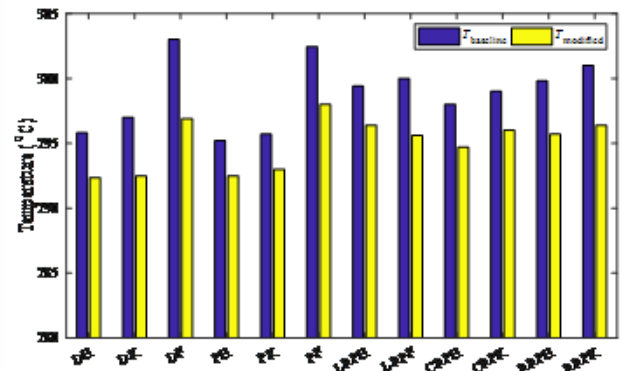


Figure 2: Solar heat flux inside cabin surface on driver plane

The idea of 4 inlets instead of one long section is to avoid coranda effect due to extremely high aspect ratio leading to fluid properties yet undiscovered. In this investigation, effect of this inlet designs on air-distribution pattern and convective heat transfer inside cabin is analyzed. Cabin is assumed sealed from inside eliminating any infiltration of air from outside. Air at velocity 2.2m/s leaving inlet at 16°C , which is a case of medium flow with turbulence between 1% and 5% is used as initial. Reason to which is average user preference and consumer sensitivity towards higher flow rates. Consumer grade material properties for all surfaces are allotted respectively. Compute time of 600 seconds show significant drop in temperature reaching to ambient environment and when compared to

conventional vent design, a prominent difference of 3 degree Celsius shows tremendous opportunity as shown below in Fig [4] near different areas of passenger.

Figure 4: Temperature distribution



The investigation revealed enhanced cooling inside cabin with thermal effectiveness increased by 15%. Predicted velocity vectors and thermal contours are used to validate the study. A continuous vent design is a simple idea of delivering more airflow inside cabin for quicker and effective cooling which not only reduces load on HVAC system on a bright sunny day but also tends to maintain thermal sensitization factor. A uniform pattern of air travel makes it pleasant for passengers when compared to non-homogeneous airflow from conventional vents which are directive.



Geetanjali Raghav Nagpal
Asst professor, UPES Dehradun

Need for awareness on prefab construction



Dr. Sunil Bajaj
Co-Chair CTTC (ASHRAE INDIA CHAPTER)

Highlights

- There is an urgent issue on huge quantities of wastage generation in construction.
- Prefabrication is becoming increasingly important to the entire construction industry.
- Innovative technologies have been effectively applied in prefabricated construction.
- As a sustainable construction method, prefabricated construction is increasingly being adopted worldwide to enhance productivity and to alleviate the adverse environmental and social effects as a result of conventional construction activities.
- Prefabricated construction offers multiple benefits - savings on cost, time and labour, apart from consistent quality. With cities growing fast, the construction of houses and commercial buildings using Prefabricated sandwich panel, or prefab-concrete components made in factories offers significant convenience.



What is the status of prefabricated construction and the reason behind this initiative?

The technology is still nascent in India even though there are a few large projects happening in a few metro cities. It is fast evolving with new

machinery, new players from various parts of the globe coming in and domestic developers increasingly looking at prefabricated construction.

It takes time for the Government to get into the regulatory mode. So the private initiative to create a handbook could be a move towards self-regulation and a guideline for all the parties involved, including equipment manufacturers, Prefabricated sandwich panel manufacturer, precast component manufacturers, developers, and others.

What is the benefit of this technology?

There are benefits, tangible and intangible. Developers and property buyers suffer when there are delays due to shortage of manual labour and construction material. Delays add to cost and quality can suffer.

With construction within the city there are restrictions on moving heavy vehicles and dumping construction material on the site. With prefabricated insulated panel and precast structures being fabricated in factories and brought into the site for assembly, the manual labour is reduced 40 per cent. A 15-floor structure that can normally take up to



24 months can be done in 12 months or less. Also with the components factory-made, there is relatively greater assurance of timely delivery and better quality control.

Time saving is cost saving for the seller and the buyer.

What is the level of market acceptance in India?

We need to increase public awareness. Make the buyers understand the benefits of quality, durability and safety.

Has the technology been adopted widely elsewhere in residential construction?

Countries like Singapore have widely adopted this technology. It is even included in the building approval process - the appropriate construction methodology for a location and building.

In India it has been used in large infrastructure projects like Metrorail projects, Railway Stations, Mohalla Clinic, Cold storages, Factories, Infrastructures.

How are buyers assured of the quality?

Prefabrication offers a substantial opportunity to improve projects' sustainable performance. However, decisions to employ prefabrication are still largely based on familiarity and personal preferences. Building comes with a commitment from the builders. Prevailing laws also provide for prefabricated construction as along they meet the safety and standards technology is not a limitation.

The goal of prefabrication systems is to offer a way to get a well-designed building that is at least roughly tailored to residents' needs. It could be stated that prefabrication systems in building construction have the most effect on time and cost reduction.



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International Conference on Sustainability in Practice



AIC Tech 2019

Full Day Conference

9.30 AM to 6.00 PM

on 22nd Nov., 2019

at Gulmohar, India Habitat World,
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