



India Chapter

ASHRAE INDIA CHAPTER

For the
HVAC&R
Industry

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BULLETIN

OPTIMAL PERFORMANCE OF HVAC SYSTEM

Reduced down time and
increased energy efficiency

From the Editorial Desk

The new ASHRAE India Chapter for the year 2014-15 has taken charge under the Presidentship of Mr. Sunil Kher. The target activities have been well established and action plan has been framed. The thrust areas would be Research activities for HVAC Development & Upgradation, R&D activities pertaining to Solar Energy with development of a Solar Powered Cold Storage. Student chapter activities would be given lot of stress with addition of new chapters. AIC Tech. would be another activity which is being done on 16th Jan. 2015. Number of technical papers by eminent personalities of HVAC field will be there. We are expecting a heavy participation. Distinguished lectures by visiting faculty would be organized. The first DL happened in August, which had a record participation. More events are in the offing. AIC team from Delhi had participated in recently concluded ASHRAE RAL CRC at Madrid. AIC received lot of awards in recognition of their efforts. Another new initiative will be to associate with Educational Technical Institutes for development of HVAC Services. We are expecting lot of activities in the current year.

ASHRAE Student Branch

at University of Petroleum and Energy Studies, Dehradun, Uttarakhand

ASHRAE Student membership programme was held on 13th Sept., 2014 at University of Petroleum and Energy Studies, Dehradun, Uttarakhand. Presentation of basic of

Air-conditioning was given by Mr. U S Jadon and Mr. Dinesh Rawat informed about the benefits of ASHRAE Student membership to a gathering of over 100 students and faculty members.

Membership forms have been received from the student and the faculty advisor. The officer bearers of the student branch have also been nominated by the student members.



ASHRAE RAL CRC, MADRID

AIC members participated at ASHRAE RAL CRC held from 19th to 21st September, 2014 at Madrid. We received the following awards

1. Presidential Award of Excellence for sustainability
2. PAOE Honor roll 2013-14
3. Certificate of achievement – RP Chair Mr. Kartik Prabhakar
4. Full circle
5. Regional Award of Merit to Ashish Rakheja
6. Presidential Award of Excellence(sustainability Activity) to Mr. K D Singh
7. Presidential Award of Excellence(start award, special citation) to Mr. K D Singh



UP coming Event

AIC - Tech 2015
16th January, 2015 at
The Theatre,
India Habitat Centre.
The theme of the event is
**'Sustainability in
Practice - Turning
Ideas in to Reality'**

AIC Annual General Meeting

The Annual General Meeting and installation ceremony of the new BOG (2014-15) elected to serve ASHRAE India Chapter for the year 1st July, 2014 to 30th June, 2015 was held on Friday, 11th July, 2014 at The Theatre, India Habitat Centre, Lodhi Road, New Delhi-110003. Members along with their spouse graced the occasion with their presence.

The partners of the event were Advance Valves Pvt. Ltd., Lloyd Insulation India Ltd., Victaulic, Zamil Air Conditioners India Pvt. Ltd, Astitva Engineers Pvt. Ltd. The program was attended by Senior members of ASHRAE including past president.



ASHRAE DL Programme

AIC organized DL lecture programme titled 'Space Pressurization : Critical spaces such as Healthcare facilities, Clean Rooms, Pharmaceutical and Laboratories' by Mr. Jim Coogan on 29th August, 2014 at The Theatre, India Habitat Centre, Lodhi Road, New Delhi-110003, The programme was attended by a record nos. 125 persons from the Industries including students. There was also a keynote address by Dr. R. Chandrashekhar, former Chief Architect of Ministry of Health & F.W. Govt. of India, Advisor HLL Lifecare Ltd. on the same subject. It was a great evening. Some of the Institutes like The Indian Institute of Architects Northern Chapter were Associate for the programme and School of Planning & Architecture were the Knowledge Partners.



OPTIMAL PERFORMANCE OF HVAC SYSTEM

- Reduced down time and increased energy efficiency

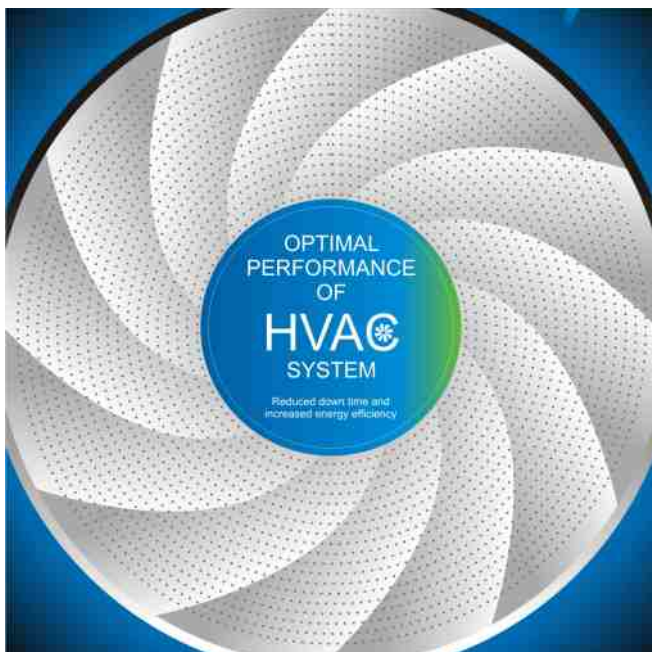
The HVAC system is at the heart of most commercial buildings. It helps in maintaining comfort levels by regulating the desired temperature inside a building either by heating the air moving inside or by cooling it and exhausting the air at the same time so that the indoor levels of CO₂ do not go beyond permissible levels.

It goes without saying that to ensure comfort and energy efficiency, one has to make sure that all the components of the HVAC system are maintained and serviced, in order to operate at optimal levels at all times.

Here are a few tips to do the same:

1. The chiller or the hot water generator and its related equipment must be started in the correct sequence for the machine to function and also prevent breakdown and reduce down time. This helps in increasing the lifespan of the components, consequently reducing the servicing costs.
2. The HVAC operator should be able to quickly identify any kind of minor problem that occurs. Many breakdown issues are eliminated at this stage. By following operation guidelines one can reduce the breakdown time.
3. A well-defined timetable should be maintained wherein the details of running the HVAC for a required period should be mentioned.

Proper guidelines & Training enable a new operator to get acquainted with the system quicker. However, care should be taken that these guidelines are analyzed periodically and revised as and when needed.



Paharpur Business Centre™ (PBC), a green mSME in the real estate and service sector, is built to mandatory Government Design. It is the first retrofit building in India that is USGBC LEED Platinum EB Certified (under O & M category) in 2010 and a BEE 5 star-rated building with a certified AAhEPI of 28 Wh/hr/sqm.

PBC offers ready-to-move-in office solutions with “world class” amenities and conference facilities on plug-n-play basis in mountain fresh air ambience at flexible terms.

Its USP, “Indoor Air Quality” (IAQ) is a sought after value to its customers. It uses patented bio-technology to provide fresh, detoxified and oxygenated air to its occupants which also helps in reducing the energy load on the HVAC system.

At PBC, the Operation practices for HVAC and its components include:

1. **A basic layout** of the complete HVAC system of which every technical staff is aware.
2. **Handbook of guidelines for the Building Management System Interface** which makes the software more user friendly.
3. The **HVAC time table** to ensure it runs only when needed.
4. The **on/off guidelines**.
5. A manual for the **sequence of operation of the system**. It is necessary when the system is started manually that all operating steps are followed or else the system will not work as desired.
6. **Data** for the maintenance of correct temperature, CO₂ level and PM levels inside the building. This data is monitored/ maintained on a regular basis.
7. **Observing Indicator and Alarm System** are serviced and maintained so that they act promptly during emergency situations like fire.
8. Procedures are in place to restore the system in case of any alarm.

Along with the operation guidelines, there is a Defined Monitoring Action Plan which is followed at PBC.

The Monitoring Action Plan outlines the sequence of operation and describes what the facilities staff should look for; what to look at; and what to do in order to ensure that an optimized system performance persists over time. This Plan is considered as a Persistence Strategy and may be offered as an additional service to the owner.

1. The "What to look for" section describes individual control parameters that make up the overall control strategy.
2. The "What to look at" section describes how the facility operators should verify system performance.
3. The "What to do" section describes what action the facility operator should take if the control sequence is not functioning correctly.

This plan not only guarantees preventive maintenance but also guides the technician or the operator specifically to do what is required in case of a particular breakdown.

A sample monitoring action plan for the Air Handling Unit is as below-

AIR HANDLING UNITS: GROUND FLOOR TO SIXTH FLOOR		
Control Strategy and Reference #:	Economizer control	
Sequence of Operation:	<p>When the outdoor air dry-bulb temperature is less than 70° F , the outdoor air dampers are opened 100% to let in the ambient air to satisfy the return air temperature set point.</p> <p>If 100% OSA cannot satisfy the return air temperature set-point, then the cooling coil valve is modulated as necessary to meet the set-point.</p> <p>The outdoor air dampers are made to regulate by CO₂ sensors once the outdoor air temperature is higher than the return air set-point. In this condition, the cooling coil valve is modulated as necessary to meet the discharge air temperature set-point.</p>	
What to look for...	What to look at (verify)...	What to do (action)...
Proper outdoor air damper operation	Physically verify that outdoor air dampers are opened 100% for all the AHUs.	If any of the outdoor air dampers is not opened properly than it should be changed to the manual mode in order to open the dampers manually. Also log in a complaint to the AMC provider

PBC has implemented various measures to ease the load on HVAC system.

1. It uses more than 1,200 air-purifying plants that not only help in detoxifying the indoor air but also maintain the flow of oxygen in appropriate amount inside the building. IAQ department constantly monitors the daily readings of various air pollutants like CO₂, PM_{2.5} & PM₁₀, VOCs etc and publishes the readings everyday on its website. As plants improve the quality of air within the building, the HVAC system pumps in less "fresh" air, so the load on the HVAC reduces. This results in energy savings of ~9.2% through HVAC.

The IAQ system also helps in enhancing productivity levels of the occupants by ~15 - 20%. This is a result of

good health and fewer sick days. It is this differentiator that makes PBC one of the healthiest buildings in Delhi NCR (as titled by CPCB, MoEF, GOI and Chittaranjan National Cancer Institute, Kolkata.).

2. It has used white mesh in the west-facing balconies in order to stop the entry of direct sunlight into the rooms which in return reduces the load on the chillers/ HVAC system. We remove the mesh during winter season in order to allow the direct sunlight inside and reduce the heating load.
3. PBC had carried out a complete retrofitting/ up gradation of HVAC system as a part of energy-efficiency project. This involved replacement of R-22 based Refrigerant chiller with energy efficient R-134 based Screw chiller, pumping system up-gradation to primary-secondary based pumping system with VFD on secondary pump, cooling tower up-gradation with VFD, replacement of traditional AHU with double skin AHU with VFD and Building Automation system for proper monitoring of HVAC system. This helped in saving 20-25% of Energy as compared to the Old system; reducing operational manpower and subsequent dependence and in having Automatic Controls.

PBC works consistently to implement measures that help in improving the performance and efficiency of HVAC system.

TITLE:
OPTIMAL PERFORMANCE OF HVAC SYSTEM - Reduced down time and increased energy efficiency

AUTHOR:
Barun Aggarwal
Director – Breathe Easy™ (Div. of Paharpur Business Centre)
New Delhi, India

PROFILE:
Barun Aggarwal is a serial entrepreneur with a versatile background and international experience spanning multiple continents. Currently, he heads the Breathe Easy™ division of PBC. Breathe Easy™ helps other companies implement solutions for improving Indoor Air Quality while reducing energy consumption.

Mr. Aggarwal actively engages in creating awareness campaigns on climate crisis and in disseminating the message of environment stewardship, especially amongst school children.

He is an investor and founder in various start-ups. In 2006, he founded TalentGenie in the United States and India – a KPO business that focuses on the recruiting vertical. He is a founder/investor in PikPerfect, a niche photo-book design service company, headquartered in Switzerland. Prior to that, he worked with Concurrent Computer Corporation for 8 years, heading European sales in the last year.

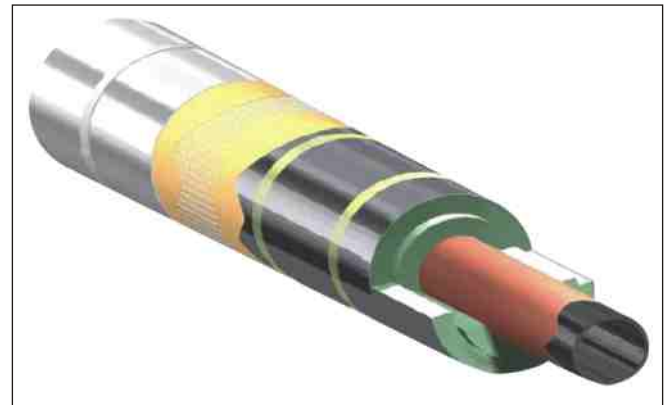
Previously, Mr. Aggarwal worked in the consulting business in Australia and as a commodities broker in Singapore. He has an MBA from the Australian Graduate School of Management, UNSW, Sydney, Australia.

ANTI CONDENSATION INSULATION

Vishu Vishal Kashyap - Dy. Manager (Technical Services)
Lloyd Insulations (India) Limited

HVAC insulation system is also termed as anti condensation concept. The purpose of insulation is to stop condensation happening over ducts, chilled water pipes and the equipments. Since they are operating at lower temperature and are surrounded by humidity in the atmosphere. Depending upon the presence of humidity percentage, the condensation also becomes critical. If there is a wind velocity, condensation problem is reduced to some extent. However in the buildings there are certain areas where after sometime condensation becomes real issue. One of such critical area is "Shaft" from where many a times, chilled water pipes run.

The shaft area is an enclosed space, which does not have any windage circulation hence it is a situation of zero windage. Shafts are the area where lot of dusts also accumulates with passage of time. The space is restricted. The insulation design of the chilled water pipe requires to be properly studied specially considering the humidity and windage factor in the thickness design. Usually when we do thickness calculation humidity and emissivity factor of the cladding is considered. Humidity varies normally from 60% to as high as 95% during the summer & monsoon period. May be the extreme situation of humidity happens for a short period but the condensation occurring during that time would be quite serious and harmful to the insulation in the long run. It is, therefore, important to consider the worst position of humidity while calculating the thickness. Second the cladding i.e. the final finish of the insulation is also to be considered properly. This numerical figure plays a role



on thickness calculation.

While considering the large value of humidity, the thickness of insulation goes up sufficiently. There is always a restriction of space in shafts whereby the insulation thickness cannot be always possible to be considered at higher levels. So there is a requirement to consider insulation materials with a lowest possible thermal conductivity value to control thickness to an optimum value. The optimum insulation thickness would ensure anti condensation happening. Also the insulation to be properly cladded so that the emissivity remains same throughout and does not get changed because of physical damage or by due to the movement of various living objects like birds, rats, maintenance staff. So insulation and cladding should be mechanically sturdy.

Another important factor should be the insulation materials selection, which should have Water Repellency property, Non-combustibility and Resistance to physical damage. This is important because any replacement or maintenance of insulation in the shaft area is very difficult.

So summing up Thermal Insulation System for chilled water pipe in the shaft area calls for proper consideration of the humidity aspects, insulation cladding emissivity, water repellent & non-combustible insulation & mechanically sturdy material. It is a very critical area of insulation application and any mistake would lead to condensation happening at later stage, which may be impossible to repair.

ASHRAE Advocacy & Membership Promotion

ASHRAE advocacy & membership promotion done during Green Building Congress held from 4th-6th Sept., 2014 at Hyderabad.



ISHRAE JAIPUR CHAPTER & ASHRAE JAIPUR SECTION Sustainable Energy & Environment Quiz

ISHRAE Jaipur Chapter and ASHRAE Jaipur section with Energy Club MNIT organised quiz programme on 23rd and 24th August 2014 in MNIT. Around 300 students from different colleges participated in the event. Guests of the event were ISHRAE Jaipur Chapter & ASHRAE Jaipur Section President Mr. Ashu Gupta and ASHRAE India Chapter Coordinator Mr. Dinesh Rawat.



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Mr. Dinesh Rawat, Coordinator
ASHRAE India Chapter
K-43 (Basement), Kailash Colony
Delhi-110048, India

Telefax : +91-11-41635655
E-mail : ashraeic@airtelmail.in
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