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WINTER 2015
Newsletter 會員通訊

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Contents

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Dave Chan
President

Message from the President

Winter is here, yet the weather in Hong Kong is still sizzling hot with temperatures of 30 degree Celsius still recorded in November. According to the Observatory, the temperatures recorded on 8 November, the "commencement of winter" in Lunar calendar, were the warmest recorded for any winter commencement since 2008. Global warming and urbanization have been blamed for such abnormal weather phenomenon. Coincidentally, the Environment Bureau launched the Hong Kong Climate Change Report 2015 in early November, which outlines the work and joint efforts of the HKSAR Government and the key private-sector stakeholders in responding to climate change. The report also mentioned that the world has to work very hard over the course of the next few decades to reduce carbon emissions by a substantial margin in order to maintain the two-degree warming scenario within this century.

Early this year, the Government also released the first-ever energy saving blueprint for Hong Kong. The Energy Saving Plan for the Built Environment 2015~2025+, which sets out a new target of reducing Hong Kong's energy intensity by 40% by 2025 using 2005 as the base. It would mean cutting consumption by 6 % of the total energy consumed in 2012. To achieve this aggressive target would require the use of the latest products and technologies while applying the best practices of operation and maintenance across the electrical and mechanical industry. More business opportunities will therefore unfold for our members.

The Government is one of the largest users of electricity in Hong Kong and is taking the lead in going green by adopting a new target of reducing 5% electricity consumption for government buildings from 2015-2020 using 2013-14 as base. During the recent regular liaison meeting with EMSD, it was agreed that ACRA and EMSD will form taskforces in order to create a platform for sharing experience and best practice on improving energy efficiency of air-conditioning systems in buildings. The members with successful experiences in the private sector will be invited to join the taskforces and contribute by sharing their knowledges with us.

ACRA is also one of the members of the taskforces and working groups of the Building Energy Code. From the recent review of the codes, we have provided professional advices on uplifting energy efficient requirements of air-conditioning equipment and installations. The upcoming BEC 2015 will be released next year and it is anticipated that the new requirements will further reduce energy use of buildings.

Getting fair assessment and timely payment from the upper-tier of the construction chain sometimes can be a problem for the industry. To better protect the interest of all contracting layers for getting paid, the DevB has recently released a consultation on Security of Payment Legislation (SOPL) for Construction Industry. This legislation is to help main contractors, subcontractors, consultants and suppliers receive payments on time for work done and services provided. It also provides a mean to rapidly resolve disputes. ACRA fully supports this legislation and provided the DevB with our feedback to the consultation document back in August.

The Competition Ordinance (Cap 610) Ordinance has been gazetted to come into full effect on 14 Dec 2015. It prohibits and deters undertakings in all sectors from adopting anti-competitive conduct which has the object or effect of preventing, restricting or distorting competition in Hong Kong. Contraventions of the Competition Ordinance can lead to serious consequences and all ACRA members are encouraged to carefully study the coverage areas and the implications to the business and operations.

Training is one of our key focuses, our training committees were busy with putting various training sessions together for our members. We have just finished a "Comprehensive Certificate Course on HVAC&R Systems in Buildings", for which the course was jointly organized with ASHRAE/BSOMES /CIBSE/HKIE. The whole training course comprised of 12 lectures spreading over three months with focusing on practical knowledges and useful skills. The response was overwhelming with a record-breaking attendance of 300 attendees joining each lecture on average.

Last but not least, I'd like to thank all our council and committee members for their hard work. Their dedication and commitment are crucial to the success of ACRA.

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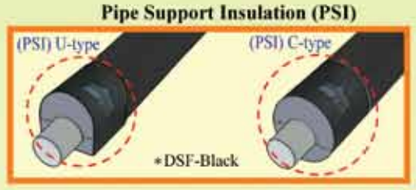

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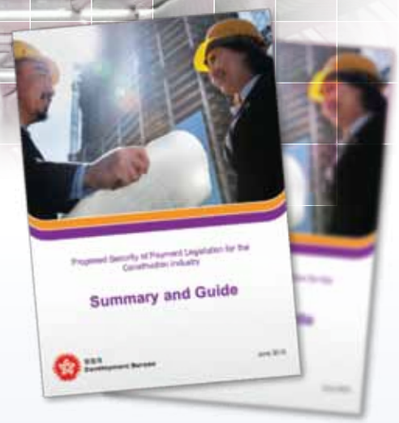
Security of Payment Legislation – Evolution for Alleviating Cash Flow Suffering and Enforcing Timely and Fair Payment Practice



What does Construction in Hong Kong look like?

With a remarkable achievement in the massive infrastructure and property development in Hong Kong over decades and promotion of partnering and spirit of mutual trust and cooperation among contract parties led by the government in recent years, construction industry in Hong Kong once labeled as fragmented and is beset with an adversarial culture with individual contract parties pursuing their own interests remain. Market norm since late 80's adopting domestic subcontract arrangement for E&M works has been aggravating the payment problem and E&M specialists at lower tier have been suffering from poor cashflow and unfair payment practice.

Payment, variations and delays are common disputes in many projects. Multi-tiered alternative dispute resolutions and prolong decision through arbitration till contract completion have deprived the contract parties of obtaining timely decision on disputes for good project administration and risk management. Payment under certified and delays and further cashflow suffering from long delays in valuating major variations, while obliged under the contract terms to continue the works in dispute have put the contractors in particularly leaving the lower-tier subcontractors without bargaining power to seek fair assessment and prompt settlement.

Revisiting CIRC Report after 15 years from its publication

Government's commitment in working with the industry to facilitate the development of a healthy and reliable construction industry was given when the report titled "Construct for Excellence – Report of the Construction Industry Review Committee" dated January 2001 was presented to the then Chief Executive. It was added that "An efficient, competitive and quality construction industry plays a key role in the continuous social and economic development of Hong Kong". "Improved security of payment to contractors and subcontractors" and "much room for improvement" are recommendation and observation stated in this report. It is of clear importance for maintaining cashflow and meeting expenses for carrying out works. Healthy cashflow is essential not only to the proper business operations and success but also in fact the survival of contractors and subcontractors.

Thanks to the government's initiatives following the recommendation of this CIRC Report implementing special administrative measures in public works contracts to improve the administration of payment to the specialist subcontractors, but these measures only happen in public works but never they have been implemented in private works contracts. Relying on voluntarily initiatives and self discipline and practice of good project administration promulgated industry wide for timely and fair payment in the past 15 years after the CIRC Report was found serving no useful purposes and hopeless in private sector.

Further survey on payment practices and problems

Following a survey on the problems of outstanding payment in Hong Kong construction industry conducted by HK University in 2010, a further survey was commissioned by Development Bureau and Construction Industry Council in 2011 and conducted by an independent consultant for a comprehensive and industry wide survey on payment practice. This survey revealed that serious payment problems were experienced by all contracting parties along the supply chain from the main contractors and subcontractors down to the suppliers, and there was no exception for the professional service consultants. The subcontractors group suffered from an average HK$9.9 billion per annum equivalent to 12% of total business receipts, and 87% of the responses from this group rated payment is a problem from very serious to serious and minor given a portion of the them are subsidiaries or affiliated companies of the upper-tier main contractors. E&M specialists in most contracts today are appointed as subcontractors, and this sector is most suffered as reaffirmed in this survey.

Particular problems revealed in the survey are "pay when paid" or "pay if paid" clause and payments are delayed by disputes. Under the conditional payment terms, there is arguable no contract obligation on a main contractor to pay their lower tier subcontractors or even suppliers if there are no corresponding payments from the employer. It has long been known as an unfair and unjust condition hurting the cashflow of the subcontractors and suppliers in particularly those are of smaller scale subcontractors and suppliers. Payments under certified, set off for contra charges deduction and delayed for certification or settlement are common issues, and final account settlement delayed beyond 18 months are common suffering of the subcontractors.

With the support of the members from different stakeholders in this industry wide comprehensive survey on payment practice, the survey results strongly proved the existence payment problems in the industry to be addressed and 73% and 67% of the responding subcontractors and suppliers respectively supported legislation is very effective or effective in improving the payment problems in private works contracts. Days before the then Secretary for Development finishing her terms of office acknowledged and said in the LegCo to start work on security of payment legislation. The same commitment on legislation was reinstated in her letter to FEMC's President on 30 June 2012, her last day being in post.

Security of Payment Legislation –
Evolution for Alleviating Cash Flow Suffering and Enforcing Timely and Fair Payment Practice

(cont'd)

Legislation in other countries

The first security of payment legislation is UK's Housing Grants, Construction and Regeneration Act 1996. A number of countries including Australia, New Zealand, Singapore, Malaysia and Ireland have enacted specific legislation in this area for their construction industry. These legislations contain core features in providing rights to progress payment even it is silent in the contract itself, notice given setting out what is to be paid and preventing set off and deduction against payment, outlawing "pay when paid" or "pay if paid" conditional payment clause, rights to suspend works for non-payment after adjudication, and rights to rapid interim dispute resolution through adjudication.

These legislation measures are intended to entitle the contacting parties delivering work done to be paid legitimately, protect the lower-tier subcontractors and suppliers from conditional payment clauses, and seeking prompt and binding decision by adjudication on payment disputes for enforcement of immediate payment to be settled by the upper-tier contract parties and for suspension of works or services to minimize further cash outlay and risk exposure in case an adjudicated payment is not fulfilled. Payment disputes shall be resolved in a rapid and expeditious process and in cost effective way by institutionalizing adjudication. These jurisdictions in other countries all provide valuable insights and implementation reference to Hong Kong to explore and formulate what framework will suit the best its construction industry..

Legislation framework in Hong Kong for security of payment

Government launched a three-month public consultation commencing from 1 June 2015 to 31 August 2015 on the proposed legislation for security of payment for the construction industry.

Key obligations, rights and limits of the legislation framework are:

a) "pay when paid" and conditional payment clauses will not be effective or enforceable.
b) Parties can agree payment periods between applications and payments but not exceeding 60 calendar days (interim payments) or 120 calendar days (final payments).
c) A right to dispute resolution by Adjudication – a rapid procedure under which an adjudicator gives an independent decision on the dispute and the amount of any payment due.
d) The right to adjudication arises in the event of non-payment and when there are disputes about the value of work, services, materials or plant and/ or disputes about extension of time and financial claims under the contract.
e) The maximum period allowed for adjudications from appointment of an adjudicator to issue of the adjudicator's decision will be 55 working days unless the parties both agree to a longer period. Staightforward cases should be decided quicker.
f) If either party is unhappy with an adjudicator's decision, they still have the right to refer the dispute to court or arbitration (if specified in the contract). Any amount the adjudicator decided as due has to be paid in the meantime.
g) Unpaid parties have the right to suspend or reduce the rate of progress of work after either non-payment of an adjudicator's decision or non-payment of amounts admitted as due.

Legislation proposed will apply to:

a) All contracts under which the Government (and specified statutory and/ or public bodies and corporations) procure construction activities or related services, materials or plant. Relevant construction activities include new build works and repair, maintenance and renovation works amongst others. Subcontracts of all tiers will also be covered regardless of value.
b) Private sector contracts but only where the employer is procuring construction activities or related services, materials or plant for construction of a "new building". Also, the employer's main contract value must exceed a specified amount (tentatively HK$5 million for construction contracts and HK0.5 million for professional services and supply only contracts). Where the main contract is subject to legislation then subcontracts of all tiers will also be subject to legislation regardless of value. Where the main contract is not subject to legislation then subcontracts will not be subject to legislation.

Revolution is the way forward

Payment dispute by bringing in adjudication with a neutral playing independent and impartial adjudicative role is needed to make prompt and enforceable decision in case of any disputes referred by the contract parties during contract execution. "pay when paid" or "pay if paid" conditional payment issue has been troubling the lower-tier subcontractors for long years, and the proposed legislation outlawing this unfair and unjust contract term for protecting the lower-tier subcontractors and suppliers to be paid for progress and completed works or product supplies shall be deserved.

Resolution by bringing in timely, binding and enforceable decision is a way to encourage contract parties to cooperate and act on reasonableness and in good faith, and payment malpractices affecting immediately the cashflow of the contractors, subcontractors and suppliers and in long term the healthy and creditable business environment and growth and sustainability of the construction industry shall be addressed with effective and enforceable means through legislation but not pledging loose initiatives by voluntary means or self discipline. E&M fully support the government taking decisive policy to enact security of payment legislation making the construction industry in Hong Kong, contributing about 4% GDP annually and employing over 8% workforce, a promising future.

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People Interview with Mr. Lam Poon Wah

林本華先生

淡水冷卻系統迄今在香港已被廣泛應用多年，其在空調節能上帶來的裨益均為業界所認同，但其實計劃成功並非一蹴而就，在計劃研究和推行初期曾遇到種種挑戰，幸得當時負責這項目的林本華工程師及其同事一一將困難克服，使計畫方可順利進行及發揚光大。這次本會很榮幸邀請到林本華先生（華哥）撥冗應邀接受訪問，與大家分享他在工程生涯的箇中點滴及得著。

專業對待工作，累積實驗經驗，迎難而上

華哥於1973年就讀於香港大學電機工程系, 並於1976年畢業。香港海洋公園是華哥投身社會的第一間任職機構，當時海洋公園尚未正式投入服務，園區內設施都加緊測試檢查以準備開幕，華哥當時負責吊車的操作，往往要攀爬數層樓高的爬梯作維修檢驗，膽識過人之餘，華哥亦對細節一絲不苟，刻盡己任檢查設備，確保遊客安全。其後加入政府擔任見習工程師，有機會接觸不同形式的機電設備, 包括: 機場、隧道等, 雖然最初負責的工程項目規模相對較小，但寶貴的實戰經驗亦從不同類型的工程中累積。華哥及後加入建築署為助理工程師，亦曾任職於機電工程署及其轄下的能源效益事務處，一直在政府服務，當中參與過各項大小型工程和保養工作，經驗豐富。

華哥回顧職場生涯，曾包辦過的項目繁多，但談及難忘經歷就不得不提舊香港政府總部水管爆裂事件，至今情景仍歷歷在目，猶記得當晚政總跳掣停電，地庫總掣位置水浸，而碰巧翌日就要舉行行政局會議，華哥聞訊立即趕至現場進行搶修，追查下得知原因是由於臨時排水喉受阻，為盡快恢復電力，華哥隨即連同一眾機電署同事通宵趕工至翌日早上，使不影響行政局會議進行。華哥後期在建築署任職時被委派負責添馬艦的冷氣工程項目，華哥早在設計階段時已謹小慎微考慮能源效益等因素，堅持做好系統設計，最後採用一個中央供冷站，將冷凍水經由地下水管網絡，源源不絕的送到添馬政府總部及立法會大樓的每個用戶，這套系統大大節省用電量，有利於環境保護。華哥面對挑戰亦迎難而上，其敬業態度與服務熱忱都獲得業界所認同。

推動淡水冷卻系統和區域供冷計劃，致力提倡能源效益

華哥推動節約能源不遺餘力，憑著其遠見卓識倡議可持續發展的理念，而當中引入淡水冷卻系統更可譽為華哥的代表作。憶述當年在機電署轄下的能源效益事務處工作時，華哥被委任研究淡水冷卻水系統及區域供冷在港推行的可行性，為此遠赴日本及馬來西亞考察，結果確定了水冷式空調系統在環境及經濟方面均帶來相當多的優勝之處，於是機電工程署在其他決策局及各政府部門的支持下， 在2000年6月推行了一個空調系統使用淡水塔計劃，鼓勵建築物持有人 / 公司採用冷卻水塔，以達至更佳的能源效益。

在計畫可行性研究期間華哥面對各方面的問題，例如用水的額外需求及排放污水處理，而當中就以退伍軍人症最引起廣泛討論，華哥特意向美國的專家及醫生諮詢意見，更邀請他們到港舉辦座談會以釋除大眾對使用冷卻水塔之疑慮及其對健康影響之誤解，增強公眾信心。華哥亦參與制定有關實務守則，強調要做好監管措施，安心使用之餘亦可達到節能目標。推行計劃以來都得到業界支持，在設計、安裝及保養都遵照守則行事，使計劃能安全有效地進行，加上顯著的節能效果吸引了更多發展商及業主紛紛轉用冷卻水塔，應用地區從之而拓闊，冷卻水塔應用得以普及化，達致能源效益之成果。

除此之外，華哥更曾參與灣仔及銅鑼灣區域海水冷卻和啟德區域供冷的可行性研究，其中灣仔及銅鑼灣區域海水冷卻計劃礙於商業考慮而擱置，然而，啟德區域供冷計劃則已落實進行了一段時間。

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AHRI CERTIFIED

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R134a

New HVAC&R Products with **Next Generation Refrigerants**

By: **Philip C.H. Yu, PhD RPE CEng LEED-AP**
Trane Pacific

A sign of the times

No doubt all of the abnormal behaviour of the nature coming along with Global Warming is a strong sign telling us that we had to act now before it's too late to protect the future for our next generation. In the HVAC&R industry, it's not difficult to find the global players who had committed to GHG reduction or more specifically phasing out the high-GWP refrigerants in their products. For instance, our company has committed to an investment of 500 million USD in product related R&D that will be cutting the GHG impact of the refrigerants by half by 2020[1]. In fact, our industry has started the works in low-GWP Alternative Refrigerant Evaluation Program (AREP) led by AHRI back in 2009[2] and committed to 5 billion while already spent 2 billion USD.

Flammability challenge

Perhaps many people has learned about R-32 in replacing some of the existing HVAC systems currently using R-410A or even replacing R-22 in some countries to fulfill the obligation of phasing out ozone depleting substance (ODS). Yet R-32 has lower GWP (675) it is a flammable fluid. As shown in Fig. 1, no matter replacing R-410A or R-22, very few candidates are non-flammable. It seems we had to face the challenge of dealing with flammable refrigerants in the future in order to pursue low-GWP.

ASHRAE Standard 34, which is a widely referenced, has come up with a new flammability class "2L" that may open up some flammable refrigerants for broader applications including human comfort though we still have to deal with the flammability in product design and engineering for safety. Recently a new refrigerant of 2L called DR-55 which appears to be a better option than the exiting R-32. It's an olefin-based blend refrigerant with similar GWP level as R-32 but lower flammability. For example, the minimum ignition energy is 40 mjoules for R-32 and 200 mjoules for DR-55. In other words, DR-55 will be 5 times more difficult to be burnt. Another important consideration of 2L refrigerants is the burning velocity. Some experiments in Japan found that a burning velocity below 5.0 cm/s is safe enough for broad applications like class 1 refrigerants. The burning velocity of R-32 is 6.7 while DR-55 is 3.0. As a candidate of R-410A in unitary products, both the lab-testing[3] and field-testing[4] results showed that DR-55 requires 10% less charge and has 5% higher efficiency, which can be to up 27% higher at high ambient conditions. These are just a few examples but obviously we are facing a lot more challenges in evaluating an alternative refrigerant, such as glide of blend refrigerant, operating pressure vs. compressor types, lubrication oil selection, etc.

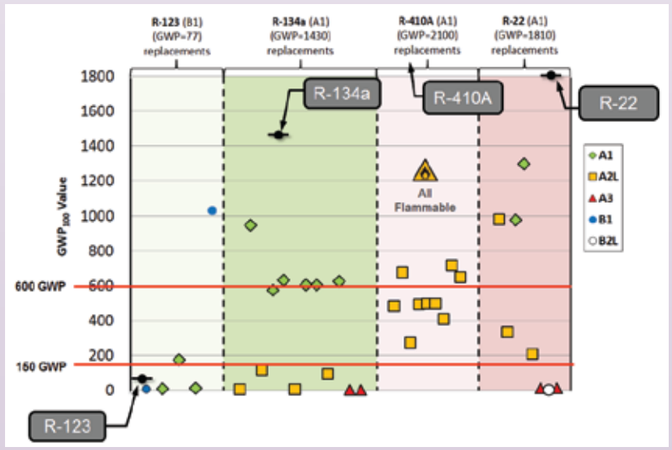

Fig. 1: Alternative Refrigerant Candidates

Non-flammable alternatives

The good news is that we do have non-flammable candidates in different categories as shown in fig. 1 but really depends on the regulatory requirement of GWP level. For instance, the new policy of HFC reduction enacted earlier this year in Japan sets different level for different application as shown in Table 1[5]. At the GWP level 750 or below, we have choice of non-flammable new refrigerants (e.g. R-513A, GWP=573) to replace the R-134a (GWP=1430) in screw chillers or medium pressure systems. It is also an olefin-based blend refrigerant that has performance, operating pressure and other properties very close to R-134a. However, if the regulatory requirement goes for ever lower GWP level (e.g. 150) only flammable options are left, such as R-1234ze or R-1234yf. Both are 2L refrigerants with GWP <1. ze has better cost over yf and its efficiency is very close to R-134a but there will be a loss of 10-20% in cooling capacity. yf will not lose capacity but it's more expensive and less efficient than ze.

Table 1: GWP target value set for various HVAC&R products in Japan

Designated products	Present refrigerant (GWP)	Target value (GWP)	Target year
Room air-conditioning	R410A(2090) R32(675)	750	2018
Commercial air-conditioning (for offices and stores)	R410A(2090)	750	2020
Condensing unit and unit refrigerating (for separate type showcases etc.)	R404A(3920) R410A(2090) R407C(1774) CO2(1)	1500	2025
Cold storage warehouse (for more than 50000 m^3)	R404A(3920) Ammonia (single digit)	100	2019
Mobile air-conditioner	R134a(1430)	150	2023
Urethane foam (for House building materials)	HFC-245fa(1030) HFC-365mfc(795)	100	2020
Dust blowers	HFC-134a(1430) HFC-152a(124) CO2(1), DME(1)	10	2019

Reference :
1 Crooks, E. "Ingersoll-Rand to phase out chemicals linked to climate change", Financial Times, 22 September 2015.
2 AHRI "Low-GWP Alternative Refrigerants Evaluation Program", Research. Air-Conditioning, Heating, & Refrigeration Institute, http://www.ahrinet.org/site/514/Resources/Research/AHRI-Low-GWP-Alternative-Refrigeran ts-Evaluation (cited 24 October 2015)
3 Oak Ridge National Laboratory
4 University of California at Davis Western Cooling Efficiency Center laboratory
5 METI. Interim Report on Products Designated under Act on the Rational Use and Management of Fluorocarbons and Standards of Judgment for Manufacturers. (original document in Japanese "改正フロン法における指定製品の対象と指定製品製造業者等の判断の基準について中間とりまとめ") Ozone Layer Protection Policy Office, Manufacturing Industries Bureau, Ministry of Economy, Trade and Industry (METI) of Japan. 29 August 2014.

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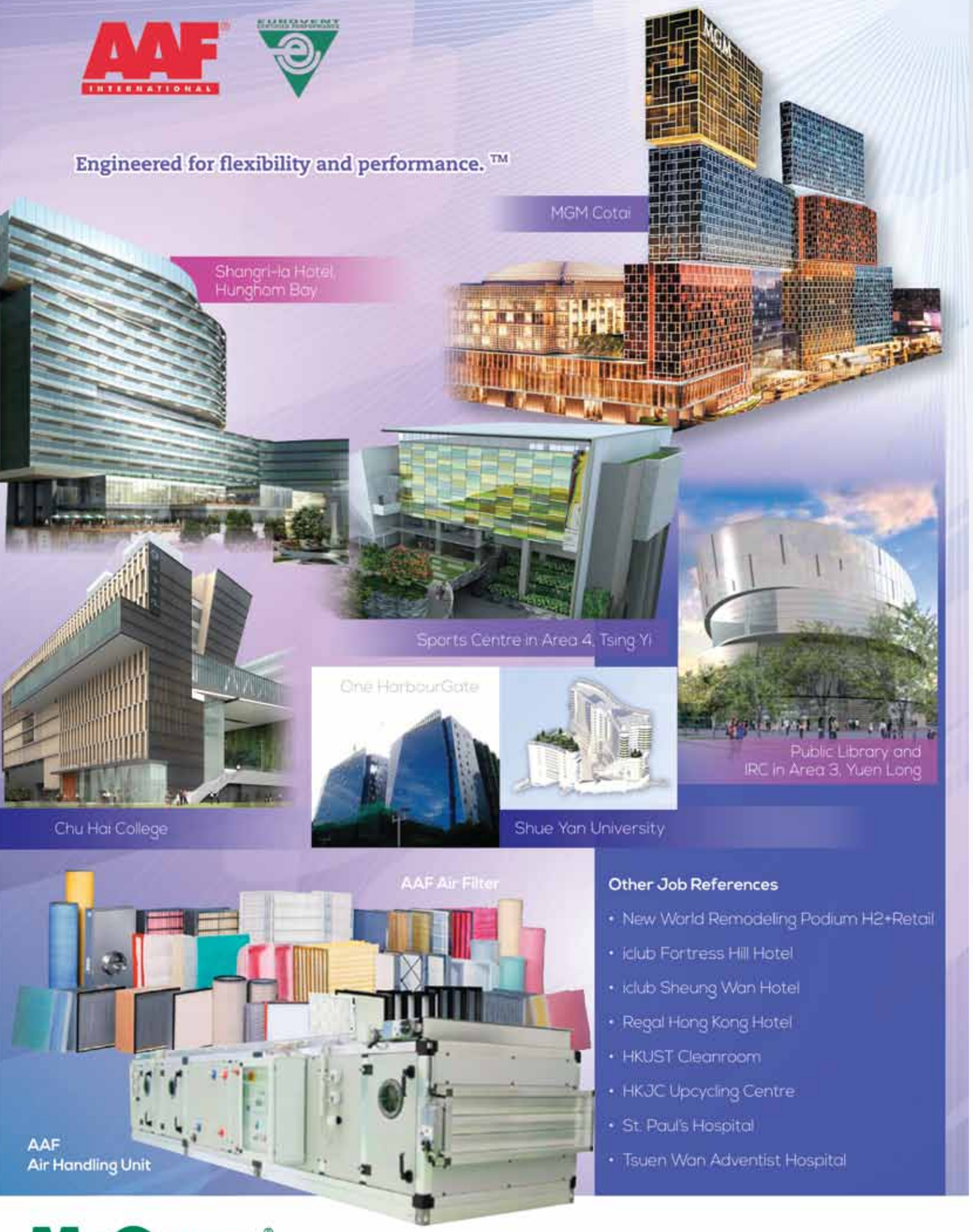

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AAF Air Filter

AAF Air Handling Unit

Other Job References

- New World Remodeling Podium H2+Retail
- iclub Fortress Hill Hotel
- iclub Sheung Wan Hotel
- Regal Hong Kong Hotel
- HKUST Cleanroom
- HKJC Upcycling Centre
- St. Paul's Hospital
- Tsuen Wan Adventist Hospital

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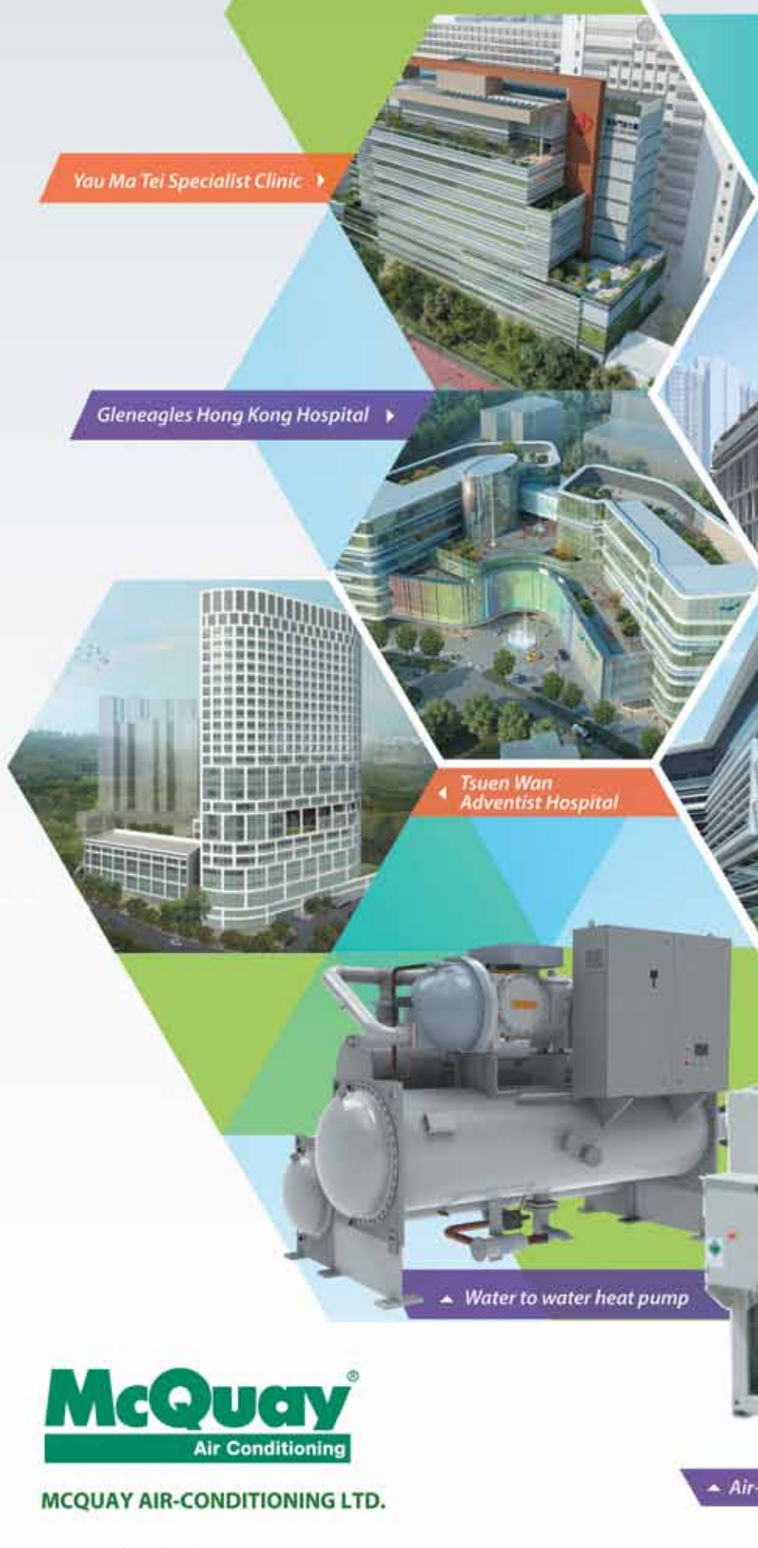

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Green Fans in Air-Conditioned Space for Better Energy Efficiency

By: **Sam Han**

Introduction

In Hong Kong, air-conditioning systems of buildings consume over 60% of the total electricity consumption in hot summer. If there are new technologies and applications that can reduce the electricity consumption of air-conditioning systems, they will benefit to the society. In fact, we always focus on the chiller systems if we talk about energy saving of air-conditioning systems. However, it is also important to consider other associated equipment, e.g. motors, fans, air side products, controls, etc. so as to achieve higher energy efficiency of the air-conditioning systems. High efficiency or high-volume, low speed (HVLS) ceiling fan is one of the good examples of these associated equipment in the air conditioning system to achieve green and energy saving, as well as making the systems become more effective and at lower operating cost without sacrificing comfort.

Air Velocity and Thermal Comfort

Owing to differences in individual personal preferences, defining human thermal comfort is challenging. ANSI/ASHRAE STANDARD 55-2013, "Thermal Environmental Conditions for Human Occupancy" is the guided standard to determine thermal comfort acceptability in an indoor environment. The purpose of Standard 55 is to specify the combinations of indoor thermal environmental factors and personal factors that will produce thermal environmental conditions acceptable to majority of the occupants within the space. The "majority" is defined as 80 percent of occupants.

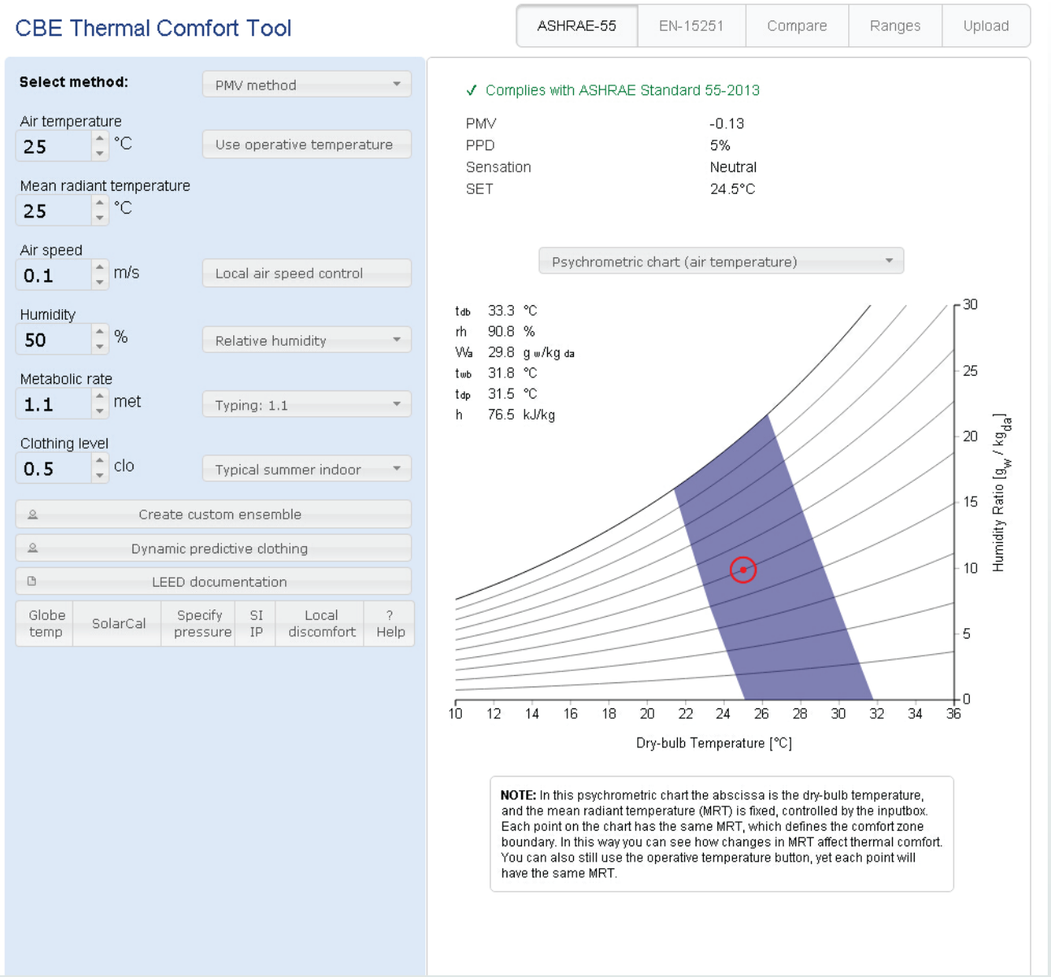
The Standard 55 takes six major factors into consideration when determining the conditions of human comfort. These factors are air velocity, air temperature, radiant temperature, relative humidity, the clothing level of occupants and the metabolic rate or activity level of occupants. Air temperature and humidity are the most commonly used and controlled factors in HVAC and, therefore, are the most energy-intensive means of providing thermal comfort. However, all six thermal comfort factors are equally important.

With the six comfort parameters, an analytical comfort zone method – the CEB Thermal Comfort Tool for ASHRAE 55 allows users to input data to determine whether a certain combination complies with ASHRAE 55. The results are displayed on a psychrometric or a temperature-relative humidity chart and indicate the ranges of temperature and relative humidity that will be comfortable with the given the values input for the remaining four parameters.

1.5-m diameter fan for residential and commercial application

Fan details

7.3-m diameter fan for industrial application



But Standard 55 has highlighted the impact of elevated air velocity on thermal comfort, and in recent years, innovative designs have re-established air movement as an integral part of comfort. In fact, increasing air velocity provides good physiological comfort, as it affects both evaporative and convective heat losses from the human body. Though it does not lower the actual temperature in a space, the perceived cooling effect can make a person feel cooler.

Energy Comparison

The electricity consumption of a conventional ceiling fan ranges from 20 to 100 watts, depending on the design and the speed of the fan. For high efficiency ceiling fans, they can save over 80% in electricity consumption than conventional ceiling fans. A single 2.4-meter diameter high efficiency ceiling fan can provide the same performance as 28 nos. standard 1.3-meter diameter ceiling fans at just one-seventh of the operating cost.

Recent changes to Appendix G of ASHRAE 90.1 allow the inclusion of energy savings from using elevated air speed in energy simulations. By increasing air velocity, high efficiency ceiling fans thoroughly distribute conditioned air and create a cooling effect throughout the space, allowing a user to raise a thermostat set point. Each degree of the room temperature set point is raised, the related HVAC energy usage is reduced by 2-3%. For example, by raising the thermostat from 23 ºC to 27 ºC, one could expect to save 15-20% on annual electricity consumption.

2.4-m high fan for indoor and outdoor events

With integration into design of new buildings, applying high efficiency ceiling fans as part of the HVAC system results in a significant reduction in the cooling capacity. In addition, high efficiency ceiling fans efficiently distribute conditioned air from ceiling to floor and wall to wall, reducing the installation of unnecessary ductworks, potentially saving a lot of money in building materials, labor and design time. Project teams working on net-zero buildings have proven the effectiveness of incorporating air movement in building plans as part of an integrated design strategy.

Recommendation

When looking for solutions to improve thermal comfort in residential, commercial and industrial spaces, high efficiency or HVLS ceiling fans can provide more options for your consideration. Meanwhile, they can help to reduce the energy consumption of the HVAC system.

Reference:

- ASHRAE Standard 55 (2013). "Thermal Environmental Conditions for Human Occupancy".
- How They Work - Summer Cooling | Big Ass Fans, http://www.bigassfans.com/summer-cooling/
- Hoyt, Tyler; Schiavon, Stefano; Piccioli, Alberto; Moon, Dustin; Steinfeld, Kyle (2013). "CBE Thermal Comfort Tool". Center for the Built Environment, University of California, Berkeley. Retrieved 21 November 2013.
- Seppänen O, Fisk WJ, Faulkner D. 2003. Cost benefits analysis of the night-time ventilative cooling. In: Proceedings of the Healthy Buildings 2003 Conference, Singapore 2003.

2.4-m diameter fan in Zero Carbon Building HK

Bamboo fan using in Bullitt Center

Hang Seng Tower **A & A Works**

Project Name	**: 2/F ~ 22/F, Hang Seng Tower, Kowloon Bay, Kln.**
Member's Role in the Project	**: MEP Works With Optimization of "Active Chilled Beam" System**
Consultant	**: Wong & Ouyang (Building Services) Ltd.**
Member/Company Name	**: The Jardine Engineering Corporation, Limited**

Background

This project mainly involved A & A works for 10 floors of existing office, each floor comprised of approximately 2,000 sqm in particular for MVAC works.

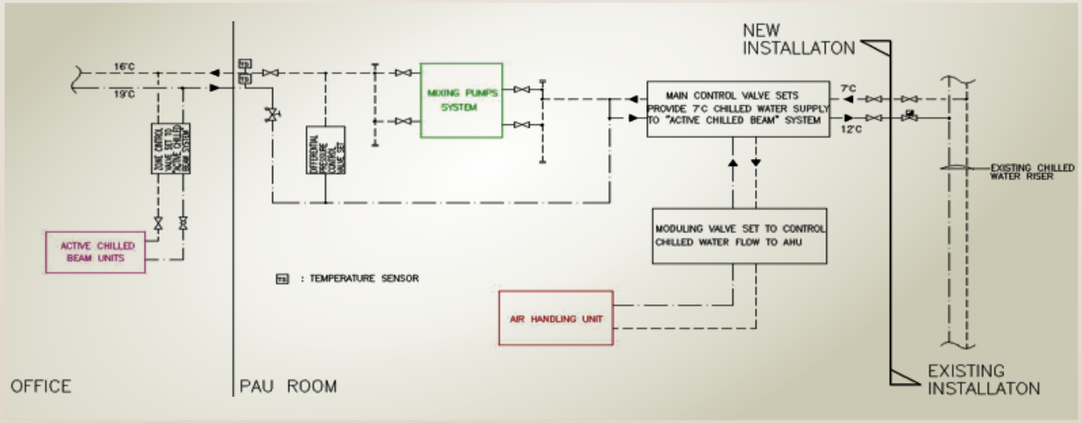
At the beginning, the customer considered different air-conditioning systems, such as Fan Coil, VAV, Chilled Ceilings and Active Chilled Beams (ACB) systems. After in-depth study of each system, the customer ultimately made the decision to adopt ACB system.

ACB has been proven to be an energy efficient system in Europe but was new to the Hong Kong Market. The project involved a the deconstruction of existing traditional "Fan Coil Units" system and replaced by ACB system for the office floors using the chilled water supply from existing chillers, chilled water pumps, power supply & plant room provisions.

The renovation works involved were required to be completed within a very short period, 45 working days per floor to suit tenant move-in logistical arrangement. It was the first application of the Active Chilled Beam system in a major retrofit project in Hong Kong.

The original chilled water system (7 °C water inlet & 12 °C water outlet) for both the air handling unit and fan coil units was modified to adapt it to the new ACB system. The ACB system required 16 °C water inlet & 19 °C water outlet with the addition of mixing pumps and new air handling units with suitable air flow rates and dehumidification coils using 7 °C water inlet & 12 °C water outlet to form the new MVAC system.

The high temperature chilled water supply to the ACB at 16 °C was achieved using a water mixing circuit to mix the 7 °C water from the chiller circuit with the 19 °C return water from the ACB system, see the operating schematic diagram below.



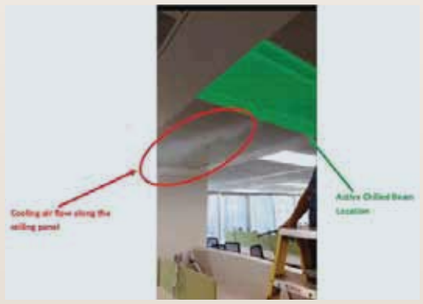
Schematic Diagram

System Equipment

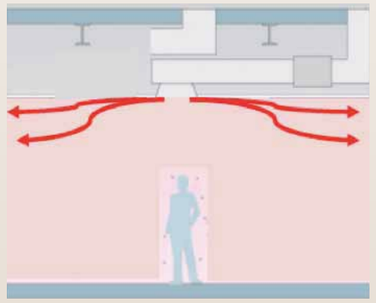
Major Equipment (Typical)	Details	Quantities
Air Handling Unit	Total air flow: 4.7cu.m./s, Static pressure: 600Pa	11 Nos.
Mixing Water Pump	Water flow rate: 12L/s	22 Nos.
Active Chilled Beam	Water flow rate: 0.048L/s, cooling capacity: 585W/pc.	2750 PCs.
Frequency Inverter For AHU & Mixing Pump	AHU: 22kW Mixing pump: 1.1kW	11 Nos. 22 Nos.
BMS with field control equipment	-	1 Lot

Highlights of System

1. Lower energy system solution compared to traditional fan coil system or VAV system.
2. Less energy required due to lower chilled water supply temperature and without fan coil motors.
3. Better comfort by individual zone control. (See picture no. 1 & 2)
4. Less maintenance cost. No fans, motors, drain pans or filters in the ceiling.
5. Higher ceiling height can be achieved as reduced air ducting size with AHU to treat the fresh air humidity (Office area from 2400mm AFFL to 2470mm AFFL). (See picture no. 3)
6. Lower room noise level as without fan coil motor running. (See picture no. 4)



Picture No. 1



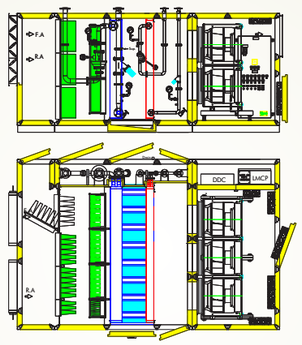
Picture No. 2

Picture No. 3

Picture No. 4

SAIVER
SINCE 1959

ECAHU



FEATURES

Energy Efficient
- Up to IE 4 motor efficiency class
- All in one design without external VSD drive loss, belt drive loss

Plug-and-play system

Multiple fan design
- Redundancy
- Less low frequency noise

Shorten the AHU length

LATEST JOB REFERENCES

- 11th Floor. Trend Centre
- Harmony Place, no.311 Shau Kei Wan Rd.
- Hong Kong Baptist Hospital
- Hong Kong Sanatorium & Hospital
- Macau City of Dream-Retail Extension *NEW*
- The Parisian Macao *NEW*
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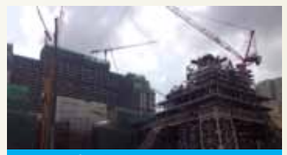
The St. Regis Macao



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HFO-1234ze

FEATURES:

- Efficiency, serviceability and safety
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- Lower running costs, and thus lower carbon emissions.

TSE Condenserless Chiller

TMH Water Cooled
(Heat Pump, Heat recovery are available)

RCE Remote Condenser

LATEST JOB REFERENCES

Disciplined Services Sports & Recreation Club

HK Baptist Hospital

TMA Air Cooled Chiller
(Heat recovery, Heat Pump, Free Cooling are available)

TMA ES Evaporative System

Zero ODP

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- MTRC 816A – West Kowloon XRL Terminal
- MTRC Contracts 771, 771B, 856, 965B, 1064, 1117
- Shatin Racecourse
- ICC Ritz Carlton Hotel
- Kerry Centre, 863-865 King's Road
- Macau Venetian P5B
- Court of Final Appeal (Ex-Legislative Council BLDG)
- Avenue Walk, Wan Chai
- SHK –Yuen Long Yoho Town

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Badminton Tournament 2015 – IES Cup

Sponsored by our member, IES (Hong Kong) Limited, the Badminton Tournament 2015 was successfully held on 15th May 2015. Here are the results and congratulations to the winning teams!

盃組賽	1st :	Honeywell LimitedJ
	2nd:	Kembla (HK) Limited
	3rd :	Jardine Engineering Corporation Limited – Team B
碟組賽	1st :	Young's Engineering Company Limited
	2nd:	Winston Air Conditioning & Engineering (Hong Kong) Company Limited
	3rd :	Jardine Engineering Corporation Limited – Team A
碗組賽	1st :	IES (Hong Kong) Limited
	2nd:	ATAL Engineering Limited
	3rd :	BYME Engineering (Hong Kong) Limited

Group photo of all participated teams

Horse Racing Night

To continue good memory of an old friend and member of ACRA who organized the wonderful Horse Racing Night in past years, the event was named in memory of Mr Derek Leung - 賽馬大亨計獎金比賽暨 Derek Leung 紀念盃 on 3rd June 2015.

In addition to the on-track thrills, the evening's excitement also included a variety of delicious cuisines, fine wines and delightful memories.

Annual General Meeting

ACRA's President, Mr Dave Chan, and Chairman, Mr Antonio Chan, gave their reports of activities in 2014-15 and direction the association will take in the coming year at the Annual General Meeting on 12th June 2015.

Comprehensive Certificate Course on HVAC&R Systems in Buildings 2015

Jointly organized by The Hong Kong Air Conditioning and Refrigeration Association (ACRA), ASHRAE Hong Kong Chapter (ASHRAE-HKC), The Hong Kong Institution of Engineers-Building Service Division (HKIE-BSD), Building Services Operation and Maintenance Executives Society (BSOMES) and The Chartered Institution of Building Services Engineers-Hong Kong Branch (CIBSE-HKB), the Comprehensive Certificate Course on HVAC&R Systems in Buildings 2015 was held from 22nd September to 3rd November.

This course is designed to broaden the knowledge of engineers in relation to Air Conditioning and Mechanical Ventilation Systems and is useful for young engineers and practitioners who want to refresh / acquire knowledge in different perspectives.

Group photo of Organizing Committee Members

Chan Fan, Frank JP, Director of Electrical & Mechanical Services, EMSD, HKSAR, delivers the opening remarks

Caring Events

Fan Delivery 涼風送暖

Jointly organized by ACRA Caring Committee and Caritas Community Centre-Ngau Tau Kok（明愛牛頭角社區中心）, The Fan Delivery（涼風送暖）event was held successfully on 25 July 2015 to render warm and care to the low-income households in Kwun Tong.

We would like to extend our thanks and appreciation to our member, **Mitsubishi Electric (Hong Kong) Limited**, for sponsoring 100 pcs of fan. ACRA also mobilized 100+ volunteers to visit 100 households. The volunteers delivered their warmth and care, as well as gifts to them.

The households being visited were cheerful in receiving the warmth and fans brought by volunteers.

100+ volunteers from our member companies supports the event.

There are totally 11 ACRA members supporting this caring event and they are

- ATAL Engineering Limited
- Bun Kee (Int) Limited
- BYME Engineering (H.K.) Limited
- Fook Loong (HK) Limited
- Jinchat Engineering (HK) Company Limited
- Krueger Engineering (Asia) Limited
- Mitsubishi Electric (Hong Kong) Limited
- REC Engineering Company Limited
- Southa Company Limited
- The Jardine Engineering Corporation Limited
- Welcome Air-Tech Limited

Fun Day Camp 開心日營活動

Through the collaboration of ACRA and Open Door Ministries（開心社區服務）, the Fun Day Camp was held on 3rd October 2015 at Wiseland Adventure（智趣樂園）in Yuen Long. More than 20 volunteers and their families from our member companies joined the 40 children from low-income households to Wiseland Adventure and enjoyed a day outdoors with amusing games and BBQ.

Member List

Contracting · Manufacturing · Servicing · Supplier

ACRA Fellow Members

Company Name		Contact Number	Website / Email	Trade
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Carrier Hong Kong Limited	開利 (香港) 有限公司	2694 5618	www.carrier.com.hk	S, S
Krueger Engineering (Asia) Limited	高雅機電工程有限公司	2860 7333	www.krueger.com.hk	C
Newland Engineering Limited	新陸工程有限公司	2967 8620	moshiu@newland.com.hk	C
REC Engineering Company Limited	盈電工程有限公司	2619 8888	www.rec-eng.com	C, S
Shinryo (Hong Kong) Limited	新菱工程香港有限公司	2237 8624	www.shinryo.com	C
Shun Hing Engineering Contracting Company Limited	信興機電工程有限公司	2419 8282	www.shecon.com	C
The Jardine Engineering Corporation Limited	怡和機器有限公司	2807 4511	www.jec.com	C, S, S
Trane Hong Kong	特靈香港	3128 4756	www.tranehk.com	M, S, S
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York International (Northern Asia) Limited	約克國際 (北亞) 有限公司	2590 0012	www.johnsoncontrols.com	C, M, S, S
Young's Engineering Company Limited	景福工程有限公司	2235 0900	www.youngs.com.hk	C, S

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Bun Kee (International) Limited	彬記 (國際) 有限公司	2748 9319	www.chinapipegroup.com	S
BYME Engineering (Hong Kong) Limited	嘉福機電工程有限公司	2881 6690	www.bymehk.com	C, S
Chevalier (E & M Contracting) Limited	其士 (機電工程) 有限公司	2111 4811	www.chevalier.com	C
China State Mechanical & Electrical Engineering Limited	中國建築機電工程有限公司	2823 7888	www.cohl.com	C
Chun Wo E & M Engineering Limited	俊和機電工程有限公司	3758 8007	www.chunwo.com	C
Cold Magic Efatar (Hong Kong) Company Limited	高美怡輝 (香港) 有限公司	2606 6922	www.coldmagicefatar.com.hk	M
Daikin Airconditioning (Hong Kong) Limited	大金冷氣 (香港) 有限公司	3966 9320	www.daikin.com.hk	S
Fook Loong (HK) Limited	福隆 (香港) 有限公司	2393 7773	www.flhk.com.hk	S
Gammon E&M Limited	金門機電工程有限公司	2516 8823	www.gammonconstruction.com	C
Honeywell Limited	霍尼韋爾 (香港) 有限公司	2331 9133	www.honeywell.com	S, S
Hsin Chong Aster Building Services Limited	新昌亞仕達屋宇設備有限公司	2579 8238	www.hcaster.com	C
Johnson Controls Hong Kong Limited	江森自控香港有限公司	2590 0012	www.johnsoncontrols.com	C, M, S, S
K-Thorn Engineering Company Limited	旗鋒工程有限公司	2481 2918	main@k-thorn.com.hk	C
Lik Kai Engineering Company Limited	力佳工程有限公司	2611 4501	ericyung@likkai.com.hk	C
Lucky Engineering Company Limited	連通冷氣電業有限公司	2780 5285	general@luckyeng.com.hk	C
McQuay Air-Conditioning Limited	麥克維爾空調有限公司	2893 6261	www.mcquay.com	S
Meco Engineering Limited	德寶工程有限公司	2891 8722	www.meco-group.com	C
Quad-Tech Engineering (Hong Kong) Company Limited	高得工程有限公司	2573 1832	quadtech@hkstar.com	C
Raising Engineering Limited	威信工程有限公司	2395 6081	simonsiu@raising.com.hk	C
Ryowo (Holding) Limited	菱和 (集團) 有限公司	2391 8381	www.ryowo.com	M
Siemens Limited	西門子有限公司	2107 6506	andy.wong@siemens.com	S
Skyforce Engineering Limited	天科工程有限公司	2885 1620	info@skyforce.com.hk	C
Southa Company Limited	南龍有限公司	2963 7175	www.southa.com	S
Standard Refrigeration & Engineering Company Limited	立德工程有限公司	2781 0871	SRE@hklpg.com.hk	C, S, S
Takasago Thermal Engineering (Hong Kong) Co., Ltd.	高砂熱學工業 (香港) 有限公司	2520 2403	sales@takasago.com.hk	C, S
Technicon Engineering Limited	得力確工程有限公司	3193 1300	technic@technicon.com.hk	C
Welcome Oncho Denki Limited	偉基溫調電機有限公司	2806 8316	www.saiver-welaire.com.hk	M, S
Westco Air Conditioning Limited	威高冷氣工程有限公司	2426 3123	mandylo@scee.com.hk	C

ACRA Associate Members

Company Name		Contact Number	Website / Email	Trade
A & R Engineering Company Limited	奇樂工程有限公司	2408 2960	general@arengco.com.hk	C
AGILE 8 Consulting Limited		2185 7679	www.coolnomix.com	M, S
Air Master International Limited	雅士 (國際) 空調有限公司	2764 0307	winston@airmaster.com.hk	M
Air Trade Centre Limited	裕風先達有限公司	2887 7000	www.atc.hk	C, M, S, S
Alpha Appliances Limited	第一電業有限公司	2529 7555	www.alpha-general.com	S
Anway Engineering Company Limited	正佳工程有限公司	2598 4228	www.anway.com.hk	S
Armacell Asia Limited	阿樂斯亞洲有限公司	2574 8376	www.armacell.com	M
Arnhold Trading Limited		2807 9400	patricklai@arnhold.com.hk	S
A Shing Engineering Company Limited	亞成冷氣工程有限公司	2537 1818	wilkiengan@ashing.com.hk	C, S
BELIMO Actuators Limited	搏力謀執行器有限公司	2687 1716	www.belimo.com	M
Biocline Healthcare Services Limited	新康醫療器材工程有限公司	2672 1111	bio@biocline.com	C, S
BioZone Scientific International Limited	陽光環科國際有限公司	2372 0218	www.biozonescientific.hk	M, S
Bitzer Refrigeration Asia Limited	比澤爾制冷亞洲區有限公司	2868 0206	www.bitzer.de	S
Brisky Limited	穿梭科技有限公司	2511 3161	tkwan@briskyltd.com	C, S, S
CDBM Engineering Consultant Company Limited	新雄力工程顧問有限公司	2598 1088	mail@cdbm.asia	C
Chi Yip Engineering Company	志業工程公司	3078 9984	canny@acmv-cy.com	C, S
Chin Tat Trading Company	展達貿易公司	3521 1589	www.chintat.com.hk	S
Chit Tat Electrical Engineering Limited	捷達機電工程有限公司	2499 0688	chittat@yahoo.com.hk	M, S
Chong Kin Air-Condition Trading Engineering Co., Ltd.	創建冷氣貿易工程有限公司	2307 5159	www.chongkinaircon.biz.com.hk	C, S
C.J. Wishing International Limited	惠生電業有限公司	2799 9797	cjwish@cjwish.com.hk	S
Clydeman Engineering Limited	佳電工程有限公司	2332 3591	daniel@clydeman.com	C, S, S
Crowntin Limited	冠殿有限公司	8202 0830	clchoy@crowntingrp.com.hk	C, S
Dah Chong Hong (Engineering) Limited	大昌貿易行工程有限公司	2768 3595	www.dch.com.hk	C
Delta Pyramax Company Limited	佳澤科技有限公司	2511 2118	www.deltapyramax.hk	S
Dextra Pacific Limited	德士達太平洋有限公司	2511 8236	www.dextragroup.com	S
Dynamic Success Company Limited	勁技有限公司	2116 9021	www.dsuccess.net	S
Earth Products China Limited	歐美大地儀器設備中國有限公司	2665 4848	www.epc.com.hk	S
Eaxon International Company Limited	恩索有限公司	3590 4656	gamescheung@eaxon.hk	M, S, S
ebm-papst Hong Kong Limited	依必安派特香港有限公司	2145 8678	info@hk.ebmpapst.com	M, S
Electrodrive Engineering Limited	高宜工程設備有限公司	2573 7211	info@electrodrive-eng.com	S
Enviro-Tech Engineering Company Limited	鷹達工程有限公司	2827 0688	steveli@envirotech.com.hk	S
Ever Cool Refrigerating & Air-Conditioning Co., Ltd.	嘉毅冷凍空調設備有限公司	2356 8598	info@evercoolhk.com	M, S
Evergreen Environmental Technology Company Limited	冬青環保科技有限公司	2562 3331	www.evergreen-environmental.com	S

Contracting · Manufacturing · Servicing · Supplier

ACRA Associate Members

Company Name		Contact Number	Website / Email	Trade
Extensive Trading Company Limited	精基貿易有限公司	2889 1681	www.extensive.com.hk	S
Far East Engineering Services Limited	遠東工程服務有限公司	2898 7331	www.fareast.com.hk	C, S
Fungs E & M Engineering Company Limited	馮氏機電工程有限公司	2682 7200	fungscww@netvigator.com	C
Gate Way Valve & Fitting Limited	基法水管配件有限公司	2688 2666	www.gatewayv.com.hk	S
GTECH Services (Hong Kong) Limited	英國通用工程 (香港) 有限公司	2123 0888	www.gtechservices.com.hk	C
GELEC (HK) Limited	香港通用電器有限公司	2919 8383	hq@gelec.com.hk	S
Gether-Force Air-Conditioning Engineering Co., Ltd.	群力冷氣工程有限公司	2890 2622	geforce@hknet.com	C
Getwick Engineers Limited	佳域工程有限公司	2893 3600	getwick@getwick.com	C
Gotop Engineering (HK) Limited	高陞工程 (香港) 有限公司	2459 3038	gotopco@yahoo.com.hk	C
Great Top Engineering Limited	宏鋒工程有限公司	2345 2219	general@greattop.com.hk	C
Hang Ji Industries International Co., Ltd.	恆基工貿國際有限公司	2721 6129	www.hangji.com	M
Hensen System Engineering Limited	豪信系統工程有限公司	2884 9001	cecil@hensen.com.hk	S
Hilti (HK) Limited	喜利得 (香港) 有限公司	2773 4705	www.hilti.com.hk	M
Honest Air Conditioning Limited	明發冷氣有限公司	2396 8108	aircond@netvigator.com	C, S
Hi Tak Thermal & Acoustic Insulation Eng. Limited	喜德保溫隔聲工程有限公司	2770 7703	www.hitakinsul.com	C, M, S
H.W. International Air-Conditioning Limited	豪華國際空調有限公司	2796 8888	info@hooair.com	M
IES (Hong Kong) Limited	恒豐工程 (香港) 有限公司	2992 0830	weston@ieshk.com.hk	S
Intelligent Technologies Limited	毅智科技發展有限公司	2301 4868	info@intelligent-net.com	S
J & J Network Engineering Company Limited	信卓網絡工程有限公司	3579 5263	www.jjnetwork.com.hk	S
Jinchat Engineering (HK) Company Limited	正卓工程 (香港) 有限公司	2687 1755	jyin@jinchat.com	M, S, S
Keio Engineering Company Limited	京王工程有限公司	2695 8872	www.keio.com.hk	C
Kembla (Hong Kong) Limited	金特霸 (香港) 有限公司	2528 0999	www.kembla.com.hk	S
Kin Wo A/C Engineering Limited	健和冷氣工程有限公司	2398 0157	kw@kinwo.com.hk	C
Kinetics Noise Control (Asia) Limited	建力聲震控制 (亞洲) 有限公司	2191 2488	www.kineticsnoise.com	M, S
Kings View Airconditioning Engineering Co., Ltd.	景匯空調工程維修有限公司	2796 2417	admin@kingsview.com.hk	C
K-Flex (Hong Kong) Insulation Company Limited	凱門 (香港) 保溫材料有限公司	2668 5202	www.k-flex.com	M
Laser Resources (Asia) Company Limited	全美 (亞洲) 有限公司	2516 7500	laasiahh@netvigator.com	M, S
LeBlanc Water Treatment & Chemicals Limited	利邦化工水處理有限公司	2408 2000	www.leblanc.com.hk	S
Lee Tack Engineering Company Limited	李德工程有限公司	2305 3111	lteo@leetack.com.hk	C
Legend Engineering Company Limited	卓越聲控工程有限公司	2815 0928	info@legendjt.com.hk	C, M, S
Lifa Air Limited	麗風空氣有限公司	2511 7076	www.lifa-air.com	S, S
Life Air IAQ Limited	活力空氣品質科技有限公司	3527 0106	winston@lifeairiaq.com	M, S
Link The Best Company Limited	必發 (香港) 有限公司	2568 4092	sales@linkthebest.com.hk	S
Mason Industries (HK) Limited	梅森實業有限公司	2967 9639	www.mason-hk.com	S
Mesan Fiberglass Engineering (International) Limited	明新玻璃纖維工程 (國際) 有限公司	2787 5717	www.mesanct.com	M
Midea Electric (Hong Kong) Limited	美的電器 (香港) 有限公司	3669 4888	www.mideahk.com	C, M, S
Mitsubishi Electric (Hong Kong) Limited	三菱電機 (香港) 有限公司	2887 4575	www.mitsubishi-ryoden.com.hk	S
NAP Acoustics (Far East) Limited	NAP 聲學工程 (遠東) 有限公司	2866 2886	www.napacoustics.com.hk	C, M, S, S
New Way Engineering Company Limited	新法機械有限公司	2325 6892	www.newway.com.hk	S
Oxprime (International) Limited	鑫輝 (國際) 有限公司	2590 8088	info@oxprime.com	S
Pacific Sense Enterprises Limited	栢昇企業有限公司	3549 5372	www.pacificsense.com.hk	C, S
Peterson Engineering Limited	必德信工程有限公司	2365 0372	stso@peterson.com.hk	C
Powers Technical Services Limited	寶華技術服務有限公司	2770 2110	powers.pts@gmail.com	C
Practical Engineering (Hong Kong) Company Limited	百利高工程 (香港) 有限公司	2402 2772	practical@practical.hk	C, S
Pyrofoe Engineers Limited	衛安工程有限公司	2388 8038	www.pyrofoe.com.hk	C
Ready Electrical Metal Work Limited	全達電器金屬製品有限公司	2898 8623	kw_leung@ready-group.com	C, M
REC Green Technologies Company Limited	盈電環保科技有限公司	2619 8817	www.yaulee.com	S, S
Regin Controls Hong Kong Limited	瑞晶溫控香港有限公司	2407 0281	saleshk@regin.se	S
Richmax Air-Conditioning Company Limited	萬聯空調有限公司	2698 3423	lawrence@richmaxltd.com.hk	S
Sanby Trading Company Limited	聖備貿易有限公司	2573 4219	www.sanby.com	S
Savills Engineering Limited	第一太平戴維斯設備工程有限公司	2534 1688	pwong@savills.com.hk	C, S
Shenling Environmental Systems (Hong Kong) Ltd.	中菱環境系統 (香港) 有限公司	2603 0002	www.shenling.com	S
Shun Hing E & M Engineering Limited	順興機電工程有限公司	2387 2882	project@shunhingeng.com	C, S
Sing Kin Limited	陞建有限公司	2333 1518	singkin@gmail.com	C
Smartech HVAC & Engineering Limited	智能空調工程有限公司	2521 9768	info@smartech-hvac.com.hk	S
Southa Engineering Limited	南龍工程有限公司	2963 7241	www.southa.com	C
Stars (Hong Kong) A/C & R Company Limited	恆星 (香港) 冷熱設備有限公司	6116 7832	stanley_yuen@hstars.com.cn	M
Super Mark (H.K.) Engineering Company Limited	高達 (香港) 工程有限公司	2595 1122	www.supermark.com.hk	C, S, S
Superpower Pumping Engineering Company Limited	力霸水泵機械工程有限公司	2745 3562	www.sppump.com	S
Sustainable Energy Limited	恆澤節能有限公司	2332 3077	www.sustaine.com.hk	M, S
Target Energy Solutions Limited	達標能源管理有限公司	2155 9882	www.targetensol.com	S
Teembase Development Limited	天基發展有限公司	2554 6263	www.teembase.com	S
Thermtech Building Products Limited	泛達建築材料有限公司	2756 3837	thermbpl@netvigator.com	C, S
Tinwood Pacific Limited	天匯太平洋有限公司	6325 1197	www.sinro.com	M
Tomi Fuji EMC Limited	富勝能源管理有限公司	2432 0170	www.tomifuji.com.hk	S
Tom's Equipment Company Limited	義隆設備有限公司	2757 5539	tom@toms-equipment.com	S
TROX Hong Kong Limited	妥思香港有限公司	2861 2261	www.troxapo.com	S
United Controls Limited	統一儀器有限公司	2556 1001	www.ucl668.com	S, S
United Regent International Limited	友益國際有限公司	2527 8003	unitedregent@unitedregent.com	M, S
Union Manor Limited	聯明有限公司	2797 2168	www.luenming.com	C
Victory Engineering Service Company Limited	維陞工程有限公司	2979 4068	pamela@ves.hk	S
Viewco Building Services & Engineering Co., Ltd.	偉保工程有限公司	2543 0610	engineering@viewco.com.hk	C
Wai Luen Air Conditioning Limited	偉聯空調設備有限公司	2890 9321	garychan@wailuenhk.com	C
Wardson Engineering Limited	華順工程有限公司	2329 8268	wsengltd@yahoo.com.hk	C
Wing Shing Air-Flow Company Limited	永盛風咀製品廠有限公司	2792 6331	contact@wingshing-hvac.com	M, S
Wolter Asia Limited	華德亞洲有限公司	2456 0198	info@wolter.com.hk	M, S
Wysermann Company Limited	威士文有限公司	2614 2213	wysermann@wysermann.com.hk	M, S
Yin On Trading Limited	賢安建材貿易有限公司	2572 7110	office@yinon.com.hk	S
Yordland Engineering Limited	日島工程有限公司	2362 2186	www.yordland.com	C, S, S
York Choi Industrial Limited	旭彩實業有限公司	2795 8286	www.yorkchoi.com	M
Zenith International Enterprise Ltd.	豐盛國際企業有限公司	2815 5852	www.ebara.com.hk	S