

### Deep Concern on Having Many Residential Building Fires

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#### 1. Introduction

In the past few months, several big fires occurred in residential buildings in Hong Kong. Fires broke out in Kwong Yuen Estate, Sha Tin [1]; Hau Tak Estate, Tseung Kwan O [2]; and the South Horizons, Ap Lei Chau [3]. The Kwong Yuen Estate fire [1] was of a huge scale, some witnesses even reported seeing blue flame. The fire was suspected to be fuelled by town gas. Reportedly, the fire at the South Horizons started from an air-conditioner explosion [3]. It was unknown whether clean refrigerant of air-conditioners was involved. The fire became a Class 4 fire. Flame, not just smoke, spread from the windows in these fires.

All these incidents illuminated the importance of raising the awareness of residential building fires. Note that the fire load density was up to  $1400 \text{ MJm}^{-2}$  in residential buildings [4], which is much higher than  $1135 \text{ MJm}^{-2}$ , the upper limit of the fire code [5].

#### 2. Characteristics

The characteristics of residential fires in Hong Kong are:

- High fire load density [4,5] in small residential units.
- Many flats are subdivided, therefore the fire hazard can lead to very serious consequences [6].
- Regular fire inspection schemes appear to be dissatisfactory, as reflected from the South Horizons fire [3]. Water was not discharged from the fire hydrant with adequate operating pressure, and it was suspected to be short-circuited as reported in the news [3].
- Open kitchen is provided in some small units of supertall buildings, and more attention should be paid to the associated risks [7].

- Clean refrigerants which are widely applied in new, environmentally friendly air-conditioning systems, can be a possible ignition source [8], as some refrigerants are hydrocarbon propane.

### **3. Deep Concerns on Open Kitchen Without Sprinkler**

Open kitchens are very common in small units of supertall residential buildings [7], however many of these kitchens are not equipped with sprinklers before the implementation of the new building fire safety code in April 2012 [9]. It is very difficult to suppress a fire in an open kitchen in small residential unit that has a fire load density up to  $1400 \text{ MJm}^{-2}$  [4]. As highlighted in CPD talks [7,10], there has not been extensive fire research to work out the fire safety provisions for open kitchens. Internal fire whirls might be induced in an open kitchen fire [11].

### **4. Conclusion**

Fire safety provisions on air-conditioning systems with clean refrigerants should be enhanced at the moment. As pointed out earlier [8], it is too early to impose restrictions on clean refrigerants. The authorities might only be able to introduce some measures after more explosions induced by clean refrigerants occurred. Perhaps, fire research would be given more attention after serious disasters. People used to learn only after painful lessons.

All the above hazards suggested that sprinklers should be considered to install in residential buildings [12].

### **References**

1. South China Morning Post, “Immobile wife dies in fire after husband flees flat”, Hong Kong, 16 February (2013).
2. South China Morning Post, “Teen fighting for life after blaze guts 10<sup>th</sup> floor flat”, Hong Kong, 20 March (2013).
3. South China Morning Post, “Seven injured in Ap Lei Chau apartment blaze”, Hong Kong, 14 April (2013).
4. Ove Arup Hong Kong, Research in East Asia, Arup research brochure, December (2010).
5. Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection Testing and Maintenance of Installation and Equipment, Fire Services Department, Hong Kong Special Administration Region, China (2012).

6. The Standard, “Still full of fire traps”, Hong Kong, 24 August (2012).
7. W.K. Chow, “Open kitchen fires in tall residential buildings”, CPD lecture organized by Research Centre for Fire Engineering, Department of Building Services Engineering, The Hong Kong Polytechnic University, Hong Kong, 5 March (2011).
8. W.K. Chow, “Lesson learnt from a recent incident in Ma On Shan : Any explosion risk for environmentally friendly refrigerants?”, Department of Building Services Engineering, The Hong Kong Polytechnic University, Hong Kong, February (2013). Available at:  
[http://www.bse.polyu.edu.hk/researchCentre/Fire\\_Engineering/Hot\\_Issues.html](http://www.bse.polyu.edu.hk/researchCentre/Fire_Engineering/Hot_Issues.html).
9. Code of Practice for Fire Safety in Buildings 2011, Buildings Department, The Hong Kong Special Administrative Region, Draft version released for public consultation in September 2011, Implemented April (2012).
10. Fire Engineering Discussion Forum - Open Kitchen, Co-organized by Fire Division, The Hong Kong Institution of Engineers and Department of Civil and Environmental Engineering , The Hong Kong Polytechnic University, 23 November (2012).
11. Y. Gao and W.K. Chow, “Onsetting internal fire whirls in a room with ceiling vents”, Journal of Applied Fire Science, Vol. 20, No. 2, p. 149-165 (2010-2011).
12. W.K. Chow, N.K. Fong, T.K. Tam and Y.K. Woo, “News from The Hong Kong Polytechnic University”, In: G. Rein (editor), International Association for Fire Safety Science Newsletter No. 34, p. 12-13, March (2013).

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